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## INTRODUCTION

For thousands of years, sporting facilities have functioned as meeting places where onlookers delighted at their countrymen's athletic prowess. Stadiums are held dear in the hearts of their people, from the Colosseum in ancient Rome to the Bird's Nest Olympic Stadium in modern China, and frequently become cultural and architectural emblems of the civilizations that built them.

Sporting stadiums play an important part in our sports life, from high school sports to the worldwide Olympic games. Sports stadiums are frequently emblems of pride and success for their communities, pushing the boundaries of architectural inventiveness. They owe so a lot to their forefathers. It is intriguing to see how the sports stadium has grown through time while simultaneously remaining faithful to its historical roots.

Sports administration relies heavily on facilities and equipment. It is critical that you understand that the presence of these two factors strongly influences your ability as a sports administrator (to be) to carry out your tasks and obligations. The availability of facilities, equipment, and supplies, as well as quality sports professionals, is critical to the growth of sports and the job of a sports administrator. As a result, in this module, you will learn the definitions of popular phrases used by professionals in order to become acquainted with and acquainted with this course.

### **What are Sports Facilities?**

Facilities are fixed, non-movable, static, long-lasting materials used in sports. Training centers, gymnasiums, stadiums, sports federations, and even universities are examples of sports facilities. They are capable of hosting a variety of events, competitions, and training sessions. While in precise terms, amenities can also include a volleyball court, jogging tracks, a basketball court, a swimming pool, a handball court, a badminton court, a long jump pitch, and so on. The majority of sports facilities cannot be transferred from one location to another since they are permanent and have a long life cycle.

### **Give me an example:**

Sports Complex is a frequent example of a sports facilities. A sports complex is a collection of sporting facilities. There are track and field stadiums, football stadiums, baseball stadiums, swimming pools, and indoor arenas, to name a few. This location is a sports complex where people may exercise and compete in sports. Sports facilities can be planned for teaching Physical Education in schools or training athletes. Sports facilities at schools are frequently used for both programs.



Picture 1



Sports Complex Project, Daegu city, South Korea

In sports, there are two sorts of facilities: indoor and outdoor. **Indoor facilities** are materials and constructions that may be easily created or contained within the four walls of a gymnasium to aid a school program. These comprise the structure or physical plant capable of enclosing a typical swimming pool, gymnasium, locker, shower, and drying rooms, teaching stations and rooms, corridors and foyers, offices, and laboratory or research rooms.



Picture 2 Indoor Facilities: The London Aquatics Centre



Picture 3 Outdoor Facilities

**Outdoor facilities** are built outside or left open to facilitate physical education and athletic programs, as seen in the majority of our primary and secondary school fields and other open fields. Sports fields, courts, and arenas will be built for track and field athletics, football, basketball, handball, hockey, badminton, tennis, and volleyball.

### Sports Equipment:

Sports equipment is any disposable object used in sports. This might be in the form of supplies and clothing required by players, coaches, and management for productivity and safety. Sports equipment is classified into the following groups:

**Games equipment:** This comprises sports equipment such as balls, rackets, and goal posts that allow you to participate in a sport.

**Player equipment:** This is equipment worn for player safety, such as boots, training supplies, and helmets.

**Vehicles:** These are employed in specialist sports such as engine sports. These are also used for transportation during athletic events, such as golf carts and carts used to transfer injured football players off the field of play. When compared to facilities, what distinguishes equipment is that it is mobile and compact.



Picture 5 Fitness Equipment



Picture 4 Game Equipment





Picture 6 Race Cars as Vehicles equipment

The term "equipment" refers to portable, durable materials used in sports that can be transferred from one location to another. They are often maintained in the store and only removed when required.

The availability of facilities and equipment is determined by the program. There is every chance of having an excellent sports program if they are available, adequate, and properly maintained. As a result, the standard facilities and equipment available in a school or state for the conduct of sports programs influence the sort of sports program that may be supplied to a large extent. Different activities need different facilities and equipment.

## Healthful Environment in Facility Planning:

The basic principles of facility planning should include, in particular, the provision for facilities that include the physiologic demands of the students, such as suitable temperature management, lighting, water supply, and noise level, toilet. The second guiding idea is to provide secure facilities. The facilities should be designed in such a way that the risk of fire, mechanical accidents, and traffic hazards is removed or reduced to a minimum. Another principle is related to illness prevention. This includes paying attention to things like adequate sewage disposal, sanitary practices, and water availability. Finally, a healthy psychological environment must be provided. This has ramifications for space, activity placement, color schemes, and distraction removal through methods such as soundproof construction.

The physical plant requires careful planning, and architectural specialists must be engaged. Administrators, physical educators, and other professionals should be involved in the planning of new facilities and be familiar with their structure and duties. In this section, you will learn about the fundamental concepts of creating a healthy environment in facility development.

To create a healthy and efficient physical plant, trends and novel structural concepts should be extensively investigated. There are two major variables to consider doing this:

**(1)** Participants must be given a safe, healthy, enjoyable, and emotionally secure environment in which to engage.

**(2)** The goal of facility planning should be to maximize the development of a healthy environment.

- Structures:
  - Design that may be used for several purposes if necessary.
  - Creation of a single story. Provision should be made for the possibility of having to raise it in the future.

- The materials chosen should make the structure both appealing and safe.
  - All precautions should be used to avoid harm.
  - Light colors should be used to paint the walls, and acoustic materials should be used to treat them.
  - The door should swing open.
  - Clothes storage (locker room), Ramps, Walkways, Split Entry, Toilet facilities should be available.
  - Provisions should be made for people with impairments and senior citizens to evaluate the structure.
- Lighting:
    - Proper illumination is essential for protecting and conserving eyesight and preventing tiredness.
    - As needed, both natural and artificial light should be given.
    - Switches and other artificial light power sources should be situated in secure areas of the facility and should be enclosed for safety.
    - The intensity of the light should be determined by the activity being performed or the purpose for which the facility is being used.
    - Glare is an unwelcome hazard that should be avoided.
- Heating and Ventilation

Thermal comfort, which is primarily governed by heating and ventilation, determines efficiency to some extent in the gymnasium, exercise center, arena, special activity rooms, and other places.

The goal of heating and ventilation is to eliminate:

- Excess heat
  - Humidity
  - Unpleasant odour
  - Gases
  - Vapors
  - Fumes and Dust from the room
  - To avoid sudden temperature fluctuations
  - To dissipate heat in a room
  - The heat given to compensate for heat loss from the human body due to radiation.
- Heating standards differ depending on:
    - Activities engaged in
    - Participants' attire and
    - The facility's geographical location
- Sanitation
 

The facility's sanitation should not be disregarded. Sanitation facilities must be carefully constructed and maintained. The supply should be safe and sufficient, and it should include:

    - Water closets
    - Urinals
    - Lavatories
    - Washroom equipment such as
      - Soap dispensers

- Toilet paper holders
- Waste containers
- Mirrors
- Hand dryers
- Hair dryers
- Waste disposal should be adequate. There should be provision for
  - Clean up
  - Removal and
  - Paper and other material recycling (that make the grounds and buildings healthy and safety hazards as well as unsightly).
  - Appropriate sewage disposal
  - Prompt waste and rubbish recycling services are required.

The above should be given as needed, and those with impairments should be considered. Weekly sanitary audits of the whole plant and facility are strongly encouraged.

- Acoustics

The different sounds connected with passionate play and involvement require unique care and regulation. Sound and public address systems can generate nervous strain and detract from the advantages of many activities. As a result, noise should be reduced as much as possible through acoustical treatment of essential areas such as hallways, gymnasiums, arenas, and swimming pools.

- Acoustical materials include:
  - Glazes
  - Plasters
  - Fibers
  - Boards
  - Acoustic tiles and fabrics

Noise-canceling floor coverings should be employed. Similarly, the walls and ceilings should be coated and noise controlled.

## **Guides For Planning, Construction and Use of Facilities**

Athletes are physically prepared through physical fitness training programs. They are psychologically prepared through a variety of programs. They are technically competent to perform the abilities of their chosen sports efficiently in a variety of competition circumstances. All of this preparation will be for naught if athletes do not have suitable training facilities before competing. In this section, you will learn about the criteria that must be followed while designing, building, and using facilities in your school and community.

Sports facilities at colleges and universities are adopting new architectural ideas in order to attract more people from their homes to the stadium. "Today, sports facility design is about upgrading the fan experience and identification to their team, as well as adapting to emerging spectator behaviors," stated Don Barnum, AIA, Global Sports head at DLR Group.

The following are guidelines for the development, building, and usage of facilities for school physical education and sports programs:

- 1) Validity: the requirements for space, structure, and fixtures must be consistent with the regulations required for the program's proper operation.
- 2) Utility: the facility should be flexible to diverse activities and programs without jeopardizing the safety or good education.
- 3) Accessibility: Facilities should be easily and immediately accessible to the person who will use them.
- 4) Isolation: facilities should be designed to keep distractions, bad odors, noise, and undesired activities and groups to a minimum.
- 5) Departmentalization: For maximum economy and efficiency, functionally linked services and activity areas should be continuous or nearby.
- 6) Safety, hygiene, and sanitation: appropriate health standards should be a primary priority in every facility development.
- 7) Supervision: Facilities should emphasize the need for adequate teacher supervision of activities within his or her control. As a result, visibility and accessibility are critical issues.
- 8) Durability and Maintenance: Facilities should be simple and inexpensive to maintain, as well as long-lasting.
- 9) The type, placement, and size of critical places and amenities must be consistent with the overall community design.
- 11) The facility should be built in such a way that it can successfully regulate the population.
- 12) Pedestrian control and spectator and guest handling should be made clear.
- 13) The structure should be designed to provide maximum security and control over all those who use the facility.
- 14) The building should have solid construction, large doors, and heavy-duty hardware and locks.
- 15) Before using the facility, each seating configuration should be finalized.
- 16) The seats should be numbered, and the tickets should also be numbered. This is to ensure that the facility is not overutilized.
- 17) Beauty: Facilities should be appealing and visually beautiful, with appropriate colors, dynamism, and designs.
- 18) The general public and facility users must be taught the typical process for using the facility.
- 19) The shower rooms, flooring, toilets and lavatory rooms, ceilings, and lighting, as well as equipment and supplies, have usage guidelines. These criteria must be thoroughly understood and adhered to.
- 20) Flexibility and Expansibility: Program adjustments and other factors for future growth should be addressed. In terms of physical education facilities, modern thought has emphasized the notion of adaptability.

As a result, facilities must be adequately planned, developed, and built to fulfill the accepted standard standards for competitiveness. It is thus the obligation of the sports administration, the architect and other advisors, and even the community as a whole to plan and build appropriate facilities for competition and other activities.

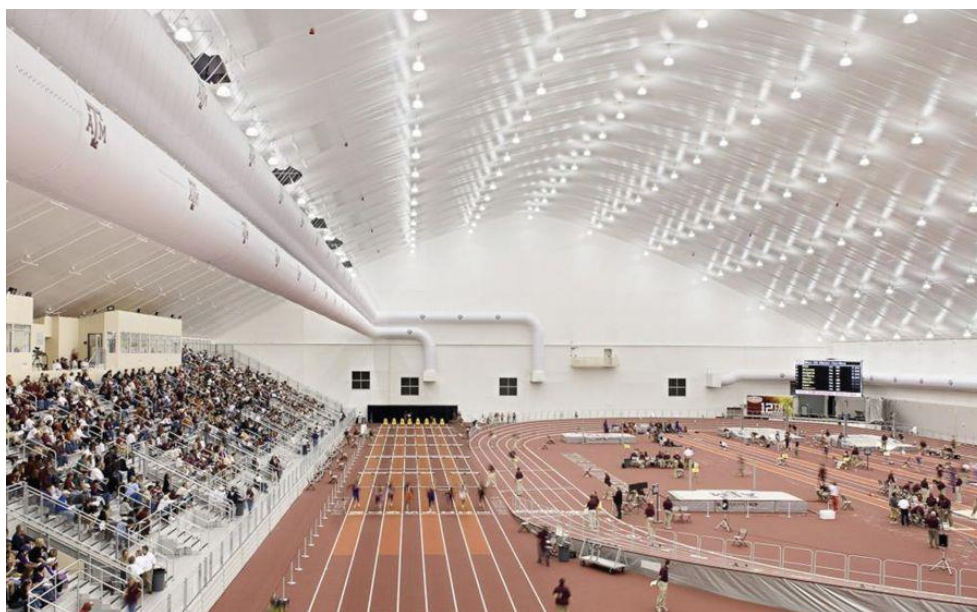
# TYPES OF SPORTS FACILITIES AND EQUIPMENT

## **Indoor Facilities**

As previously said, indoor facilities are materials and constructions that may be easily erected or contained within the four walls of a facility called a gymnasium to assist a learning program. The structure or physical plant capable of enclosing a conventional swimming pool, gymnasium, locker, shower, and drying rooms, teaching stations and rooms, corridors and foyers, offices, and laboratory or research rooms are examples of these.

The following amenities will be available inside:

- (1) Personnel offices
- (2) Locker rooms (located near the activity area for storing and dressing) with seats, mirrors, scales, sauna, hairdryer, and drinking fountains, among other amenities.
- (3) Showers (washing/drying rooms)
- (4) Swimming pools
- (5) Racket sport arenas
- (6) Weight-lifting and workout facilities
- (7) Arcades
- (8) gymnasiums
- (9) velodrome
- (10) Metrodome



## CONSIDERATIONS IN CONSTRUCTION OF INDOOR FACILITIES

- **Location Selection**

All staff, including program experts, architects, engineers, and others, should be included in the site selection process for any new building. Consideration should be given to the following factors:

- Proximity to the classroom
- Traffic/pedestrian patterns
- Movement of automobiles and parking space
- Soil and drainage conditions
- Utility accessibility.
- Connectivity to other health, physical education, recreation, and athletic facilities.
- Housing proximity.
- The location should not be in a space that is too tiny to accommodate design alternatives or extensions.
- Future facility expansion ideas

- **B. Traffic Circulation**

Driveways should be wide enough to provide direct access to the parking area and should not cut through play areas. The most important consideration in traffic circulation and control is the building's location, as well as minimizing congestion in corridors, staircases, locker rooms, and spectator areas, as well as minimizing disturbances in student and staff offices, classrooms, and study rooms, enhancing efficient and safe movement, and providing for future building expansion.

- **D. Participant Security**

Individual security should be provided, as people enter the general structure through several exterior doors and disperse to offices, classes, dressing rooms, activity areas, and spectator galleries. The following are security measures:

- All personnel utilizing the building should be directed and controlled.
- All swimming pool doors should be locked while there is no class in session and should only be opened by authorized personnel.
- In a gymnasium, the area or store where equipment such as trampolines is kept must be locked up after usage.
- Viewing balconies and steps should have railings and lights on the sides or luminous reflecting materials on the edges.
- Obstructions and items should be avoided in activity areas, shower rooms, and dressing rooms.

- **E. Security of the Building**

The first and most obvious aspect of building protection is the security of the building and its component rooms against the unauthorized entrance. To defend against wear, misuse, loss or damage, and theft, good door construction, robust doors, heavy-duty hardware, and lock hold-up are required. In addition, the following measures should be implemented:



- Surveillance systems should be put in place.
- Avoid windows that are within touching distance of the ground.
- There should be no windows in storage facilities.
- Install security lighting and cover outside lights with vandal-resistant guards.

## Outdoor Facilities

Outdoor facilities are built outside or left open to facilitate physical education and athletic programs, as seen in the majority of our primary and secondary school fields and other open fields. Playgrounds, sports fields, courts, and arenas will be built for track and field athletics, football, basketball, handball, hockey, badminton, tennis, and volleyball.

Before deciding on a location for outdoor amenities, consider the following factors:

- Topography
- Soil drainage
- Water supply
- Water table
- Acreage
- Shape and Natural features

The outdoor facility should be close to the locker room for refreshment, but far enough away to avoid congestion and allow players to move freely. The facility should satisfy the people's needs and interests. Playgrounds and sports fields should have decent turf and be free of rocks, holes, and uneven surfaces. There is no debris or dust on the surface.



Picture 7 Outdoor Sports Facilities, Hope Park Sports, Liverpool, UK

Indoor and outdoor facilities should be designed in such a way that effective crowd control, seating arrangements, and service area utilization are encouraged. Poor or subpar facilities will, without a doubt, impact subpar performance and end in an unsatisfying conclusion. It may cause sportsmen or spectators to respond negatively.

## Facilities for People with Disabilities

As a growing number of persons with impairments participate in sports, new assistive technology is being developed. Assistive technology gadgets are pieces of equipment that help persons who are disabled. These gadgets might be basic, "low-tech," or they can incorporate complex technology, including computers. Sports assistive technology might be basic or complex.

Assistive technology is used in a wide range of sports, from small community leisure to top Paralympic competitions. As more complicated assistive technology devices have been created throughout time, sports for individuals with impairments "have shifted from being a clinical therapeutic tool to an increasingly competitive pastime."

- Sports programs include:
  - Specialized development exercises
  - perceptual motor ability activities
  - rehabilitation exercises
  - health and fitness
  - modified sports
  - stress management
  - rest and relaxation

As a result, facilities for people with disabilities should be provided by the debilitating state of those served.

- **Mobility Impairments:**

Lightweight wheelchairs for basketball, tennis, and racing are available, as are all-terrain wheelchairs with durable frames and wheels for rolling over uneven surfaces such as hiking trails, snow, or beach sand. Others include handcycles, or recumbent bicycles, which are similar to bicycles with pedals and steering using only the rider's arms, weights that users strap onto their wrists rather than holding them with their hands, gym equipment that allows users to remain in a wheelchair while using arm exercise machines, mitts with Velcro straps that help users hold onto an exercise machine if their grip isn't strong enough, and elastic band or tubes that exercise muscles through resistive exercise.

A handcycle is a sort of human-powered land vehicle that is propelled by the arms rather than the legs, as is the case with a bicycle. The majority of handcycles are tricycles, having two coasting back wheels and one steerable motorized front wheel. Despite having three wheels, they are also referred to as handbikes.

- **Visual impairments**

Athletes with vision impairments have access to equipment such as beeping softballs, which allow persons with visual impairments to find the ball to hit and catch it. Basketballs with jingle bells inside for those with low or no vision.



Picture 8

Rio 2016 Paralympics



Picture 9

Tokyo Paralympics at Musashino Forest Sport

Sports that make use of assistive technology devices may include:



In today's sports programs, people with disabilities are encouraged to participate in the least restrictive activity possible. Although some unique equipment may be required, mainstreaming or integration into the main group is the tendency. This tendency, however, necessitates accessibility, careful preparation, and a concerted team effort on the part of parents and employees.

## CONSTRUCTION OF SPORTS FACILITIES AND EQUIPMENT

Most physical education, sports, and recreational programs take the physical plant into account. New architectural ideas are being introduced, as well as new concepts, to create a more cost-effective and functioning facility. Convertibility, for example, rearranging interiors by employing features such as movable walls and partitions and using facilities such as the gymnasium and amphitheater for a range of sports such as basketball, volleyball, and tennis are some construction principles. Such adaptability is required to allow a variety of activities, including small and large group instruction as well as independent study rooms. The adaptability also ensures critical activities such as team teaching and the efficient installation and usage of electronic aids. In this session, you will learn about the many steps to take when planning sports facilities, as well as elements to consider when establishing teaching stations and new features in the development of physical education facilities.

Facility planning involves two major principles: the principle of program needs, which states whether the facilities are for program needs or community recreation; and the principle of cooperative planning, which states that a team of specialists should work together to plan and construct the facility to avoid mistakes and to produce a durable and standard facility.

## Planning The Facility

At the outset, physical educators should keep two ideas in mind when it comes to facility development.

- **(1) Program needs:** This refers to whether the facilities are a consequence of program needs or are for community enjoyment.
- **(2) Cooperative Planning:** This is vital for avoiding typical blunders.

### (1) Program needs:

The objectives, activities, and instructional techniques and materials, administrative rules, equipment, and supplies are examples of program facility concerns. Both the school's and the community's educational and recreational requirements. All of this should be considered by both school administrators and physical educators to build facilities that are adequate for the needs.

- (a) User group requirements: The planning should consider whether the facility will be used for:
  - i. Students (for teaching/educational purpose)
  - ii. University Athletes (for competition)
  - iii. People from the community (for recreation)
- (b) Activities: When planning, keep in mind the activities that will take place inside the building.
  - i. Lectures, Experiment, Research
  - ii. Training or test
  - iii. Recreation and relaxation
  - iv. Competition

### (2) Cooperative Planning

Similarly, the opinion of both architects and laypeople is important if facilities are to be built correctly. As a result, the planning should include an expert TEAM comprised of:

- Manager/employer/management
- Facility manager
- Coaches
- Architects
- Engineers
- Program specialists
- Personnel of :
  - Public safety Dept.
  - Building and grounds
  - Maintenance
  - Policy board
  - Building Task Force

Technical knowledge in the form of standards and guidelines may be gathered from a variety of sources for Quality and Standards during planning, such as:

- (a) State health departments (for safety and sanitation code)
- c) Sports organizations and federations
- d) Professional journals

## **Steps in Planning**

### **1) Developing of Policy**

It is critical to draft a statement of purpose and philosophy for the usage of the facilities throughout the planning process. There should be a clear policy governing the functions of school buildings and the amount to which the community may utilize them. If the policy calls for communal usage, the facility must be built to satisfy these requirements. Facilities built with no consideration for community usage are frequently inadequate for mixed programs. A building subcommittee should be constituted, comprised of those who will require the facilities to:

- a) Create a general plan that defines the purpose and usage of the facilities.
- b) Make suggestions on the sources of finances for the facility's construction, as well as the type and placement of the structure.

### **2) General Plan**

The goal here is to give the architect an overview of the physical education curriculum to help guide his thoughts throughout the preliminary planning. The general plan should incorporate program needs such as enrollment, class size, and community usage area, kind of educational activities, service areas, and special uses.

### **3) Review of the General Plan**

Following the overall plan, the preliminary plan must be reviewed. If the overall strategy is suitable, a particular proposal might be given.

### **4) Specific Recommendations**

Following the broad strategy, the specifics must be incorporated. They are locker kinds, shower heights, floor construction, floor covering, and so forth. A checklist can assist in ensuring that no details for a functional facility are omitted.

The following are the general ideas for facility planning:

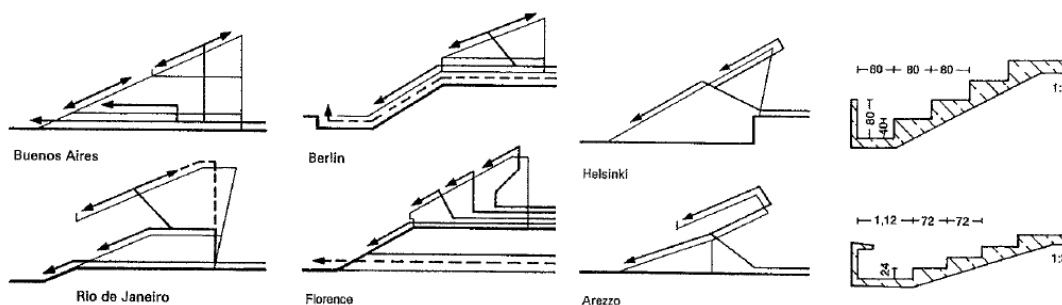
1. Establish a priority for facility utilization.
2. Create amenities that are suitable for the community's distinct qualities.
3. Indicate the age range for whom the facility is intended.
4. Estimate the population growth rate early in the planning process.

5. If it is a new school, it should be built to last fifty (50) years.
6. Create facilities for effective supervision.
7. Reduce the number of school and park facilities in the same community.
8. Park and school authorities should collaborate closely on facility issues.
9. The physical educator must persuade relevant administrators to implement new concepts into facilities.
10. Physical educators should be well-versed in facility planning.
11. Physically disabled people should be considered in planning.
12. Facilities upkeep after construction should be considered.
13. It is necessary to construct a model of the planned facility.
14. Physical educators should make every effort to get the greatest available facilities.
15. School planning should take into account the various sorts of activities in the programs at each educational level.

## Details and Floorplans to follow to have a perfect sport facilities

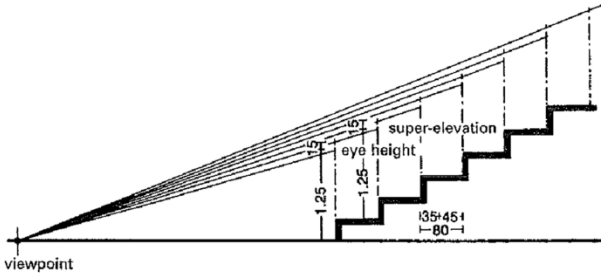
Ancient stadiums, whose vastness has never been equaled (the Circus Maximus in Rome could seat 180,000 people), continue to serve as the foundation for today's sporting grounds. The proportions are usually defined by the football pitches 70 x 109 m layout and the running track that surrounds it (p. 323). The playing field is shaped like an ellipse, which is akin to the old egg form. In most cases, a stadium is partially excavated into the ground and the soil removed is piled around it. Sports facilities must fit well into the landscape, and transportation and utility supply conditions must be good: train, bus, tram stations, huge parking lots, and so on. Smoke, smell, and noise are all unwanted in the near neighborhood, thus industry should be avoided. Sporting facilities, both covered and open-air, can be merged and integrated into the city's zoning design. According to the various times of competitions, ancient arenas were typically oriented west-east or south-north; in Europe, northeast-southwest, so that most spectators had the sun behind them. As a result, the eastern end has open openings.

The pay booths were placed far forward, and the flow of people was dispersed around the stadium behind them. These allow access to the half-height stand and subsequently to the rows above and below 0, usually through the heaping areas or steps. The Roman architect Vitruvius advised a constant gradient of 1:2 for both rows of sitting and standing spaces for acoustic reasons. When loudspeakers are utilized nowadays, the inclination must only provide a satisfactory view. As a result of the staggered seating, each row of the audience should be able to look over the heads of the two rows in front. A parabolic curve is the outcome of this. From the long side of an arc, the optimum viewing conditions exist. The abrupt rush of spectators departing (as opposed to the slow trickle of those coming) must be used to determine the breadth of the access tunnels and stairs. According to C. van Eestern's estimations, every 5000 fans in the Amsterdam stadium will need 7 minutes (or 420 seconds) to exit down the 9.5 m wide stairwell (in Los Angeles 12 minutes, in Turin 9 minutes). The formula for the necessary stair width for a defined number of spectators intending to leave the stadium in a desirably short time would therefore be  $\text{stair width (m)} = \text{no. spectators} \times \text{evacuation time (s)} \times 1.25$ . First-aid rooms should be provided according to the number of spectators and close to the spectator area. A group of rooms is necessary for every 20,000 spectators: treatment and rest room 15m<sup>2</sup>, store room 2m<sup>2</sup> and two toilets with lobbies to prevent smells transmission. For stadiums with room for more than 30,000 spectators, there should also be a 15 m<sup>2</sup> room for public safety personnel (police, fire service).





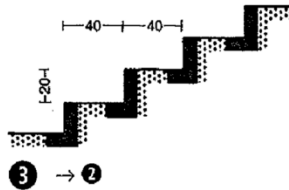
# Stadium: Spectator and VIP areas



1 Sight line construction



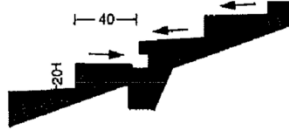
2 Concrete units



3 → 2

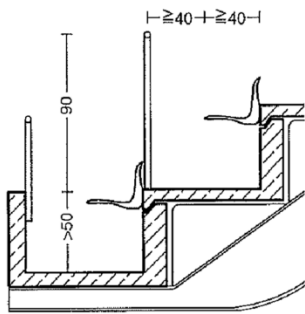


4 → 2

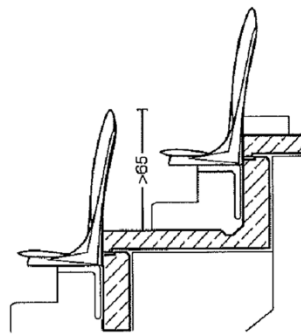


5 Sloping reinforced concrete with drainage

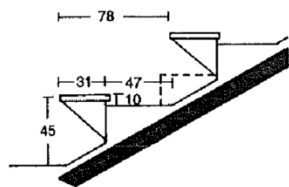
## seating steps



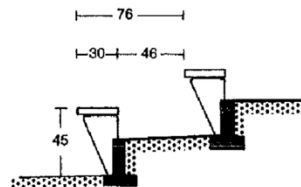
6 Steps > 50 cm high must be provided with fall protection min. 90 cm high



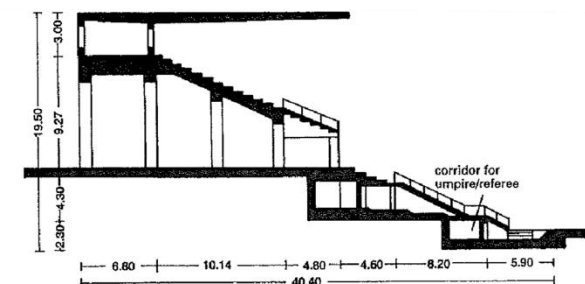
7 If backrests are > 65 cm high, barriers can be omitted



8 Sloping reinforced concrete slab with steps



9 No fall protection is required for steps < 50 cm high



10 Section through the Berlin Olympic stadium Arch.: Prof. Werner March

The design is based on the applicable state Places of Assembly Regulations, which include regulations for access routes, stairs, ramps, and spectator areas. Additional rules can be imposed by governing sports organizations, such as the FIFA criteria for international games, which ban standing in stadiums. Stands are either situated on the long sides of the sports field (for a good view since the distance is not too great) or around the entire playing surface for more than approx. 10,000 spectator places, depending on the number of spectator places planned. Because most athletic events take place in the afternoon, the finest viewing areas are on the west side of the stadium (no glare).

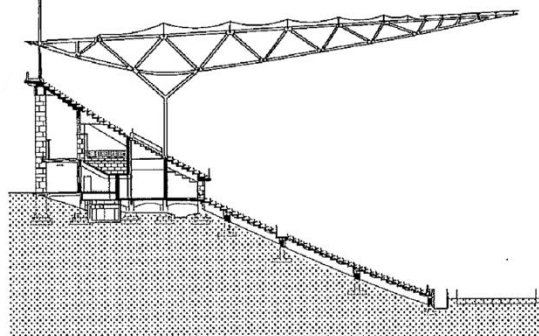
## Seated areas

If the spectator seats are organized in a multi-row pattern, there should be enough super-elevation to optimize viewing conditions. This can be a linear gradient of 1:2 for smaller stands with up to 20 rows of standing areas or 0 rows of sitting, but in all other stadiums, the linear gradient should be parabolic. In this case, the gradient for sitting and standing places can be determined by using spectators' sightline construction, with the super-elevation 12 em for standing places and 15 em for rows of seats

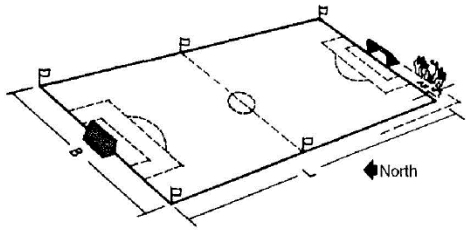
When there are more than 5000 visitor spots, the needed space in rows of sitting is two visitors per m<sup>2</sup>. This can be given as row seating (benches) or individual chairs, which must be fixed and immovable. Seats with backrests provide additional comfort (minimum height of 30 em per FIFA criteria) and a clear passage width of 40 em between rows of seats is required. Seats must be grouped in 30-row blocks at a maximum. Aisles with a minimum width of 1.20 m must run behind and between the blocks. Each row of chairs may contain 20 places if there is an aisle to the open air on one side, or 40 places if there is an aisle to the open air on both sides, depending on the configuration of the entrance and exit ways. Separate sitting and standing areas are required. Every 600 spaces, a 1.20 m wide escape path (steps, ramps, level surfaces) must be provided, with a minimum width of 1.20 m.

## Standing terraces

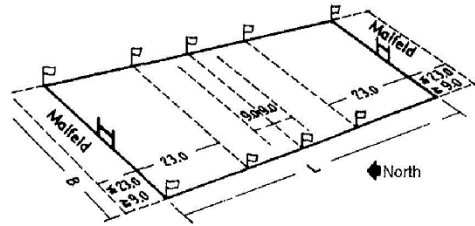
In standing terraces, two visitors every running meter of the terrace are necessary for architectural purposes. Every 600 spaces, a 1.20 m wide escape path (steps, ramps, level surfaces) must be provided, with a minimum width of 1.20 m. Standing spaces should be separated into blocks of roughly 2500 spots to ensure that they fill and empty evenly and to avoid deadly crashes. These areas should be cordoned off and accessible separately.



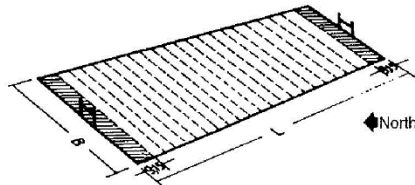
11 Section through the Berlin Olympic stadium after rebuilding Arch.: Gerkan Marg u. Partner



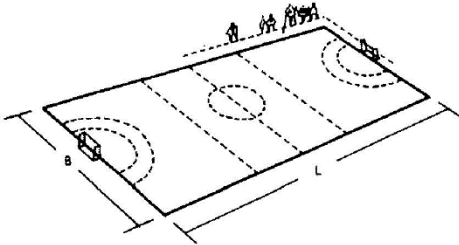
1 Football



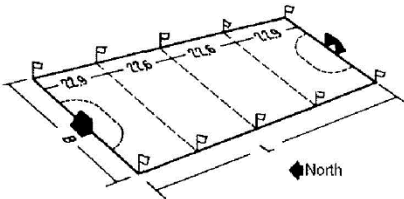
2 Rugby (German)



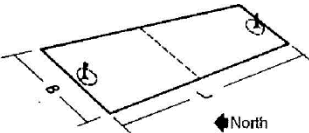
3 American football, goals 5.50 x 3.05 m



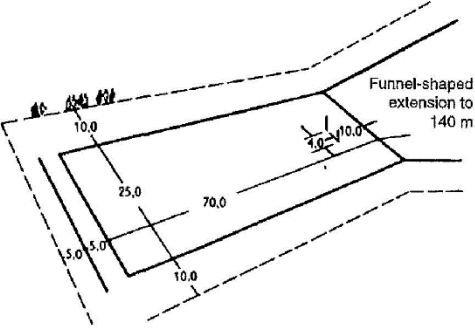
4 Handball



5 Hockey

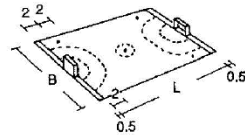


6 Netball, net diam. 55 cm, 2.50 m high

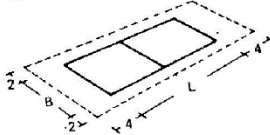


7 Softball/rounders

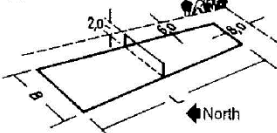
Sport	Competitive sport			Leisure sport			Net Height (m)	Goal / basket (m) W = width H = height	
	Playing area dimensions (m)	Free space around sides (m)	Free space around ends (m)	Total area (m)	Playing area dimensions (m)	Free space around sides (m)			Free space around ends (m)
Football	45-90 x 90-120	1	2	46-91 x 92-122	68 x 105	1	2	69 x 107	W = 7.32 H = 2.44
Football, FIFA requirements	45-90 x 90-120	2	3.5	47-92 x 93.5-123.5	68 x 105	2	3.5	70 x 108.5	W = 7.32 H = 2.44
Rugby	68.4 x 100	2	12-23	70.4 x 123	68.4 x 100	2	12-23	70.4 x 123	W = 5.60 H = 3.00
Handball	55-65 x 90-110	1	2	56-66 x 92-112	60 x 90	1	2	61 x 92	W = 3.00 H = 2.00
Indoor handball	18-22 x 38-44	1	2	19-23 x 40-46	20 x 40	1	2	21 x 42	W = 3.00 H = 2.00
Hockey (field hockey)	—	—	—	—	55 x 91.4	2	4	57 x 95.4	W = 3.66 H = 2.14
Netball	25 x 60	1	2	26 x 62	25 x 60	1	2	26 x 62	net H = 2.50
Softball/rounders	25 x 50-70	10	10	35 x 60-80	—	—	—	—	pole H = 1.50
Indoor cycle polo	9-11 x 12-14	0.5	0.5-1	9.5-11.5 x 13-15	—	—	—	—	W = 2.00 H = 2.00
Volleyball	9 x 18	2	3	11 x 21	9 x 18	2	3	11 x 21	2.43
Prellball	8 x 16	2	4	10 x 20	8 x 16	2	4	10 x 20	—
Schleuderball	—	—	—	—	15 x 100	8	30	23 x 130	—
Fistball	—	—	—	—	20 x 50	6	8	28 x 58	2.00
Basketball	15 x 28	1	1	—	—	—	—	—	3.05
Streetball	13-15 x 24-28	1	1	14-16 x 26-30	—	—	—	—	3.05



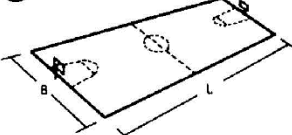
8 Indoor cycle polo



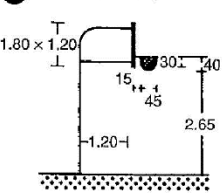
10 Prellball



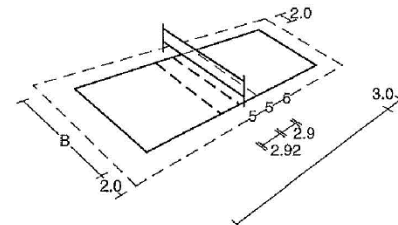
12 Fistball



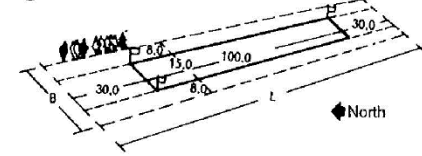
13 Basketball → 14



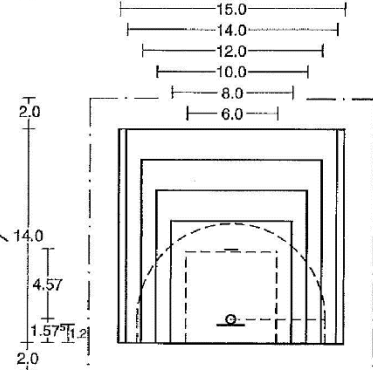
14 Basketball basket → 13 + 15



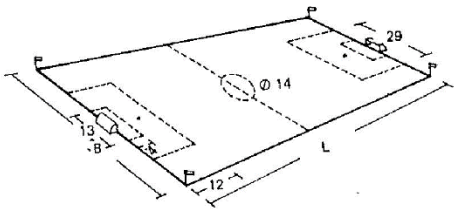
9 Volleyball



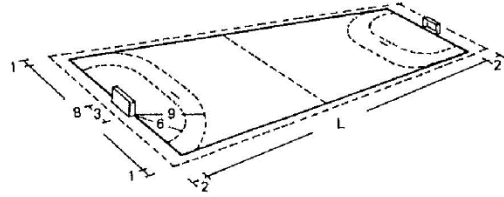
11 Schleuderball



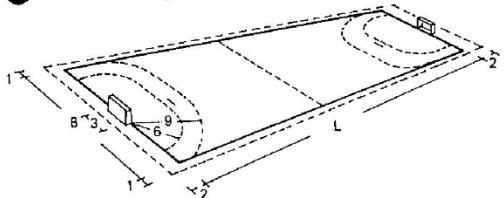
15 Streetball → basket 14



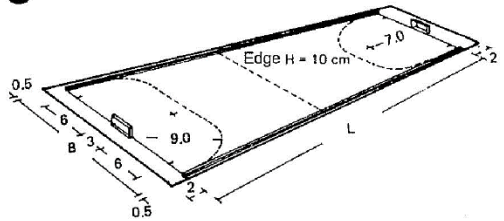
1 Small playing field for school football



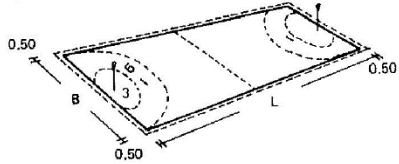
2 Indoor football, goals 2 x 3 m



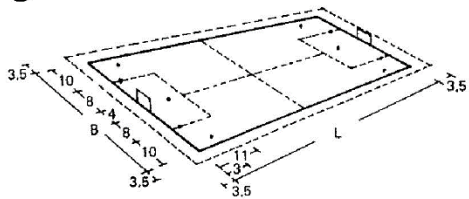
3 Indoor handball



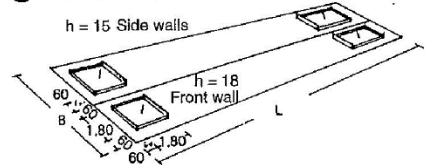
4 Indoor hockey



5 Indoor netball, net diam. 0.55, 2.5 m high

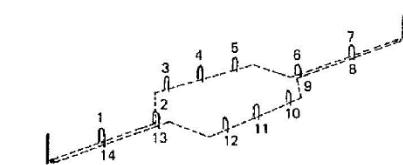


6 Cycle polo on grass

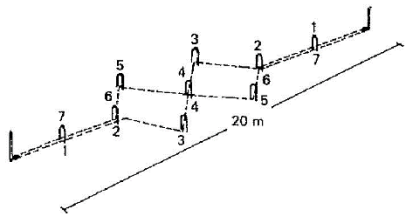


7 Horseshoe throwing

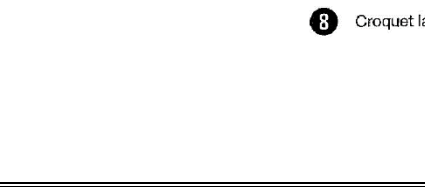
12 Tennikoit



13 Baseball

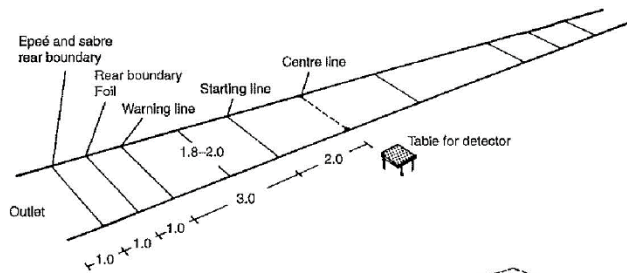


8 Croquet lawns

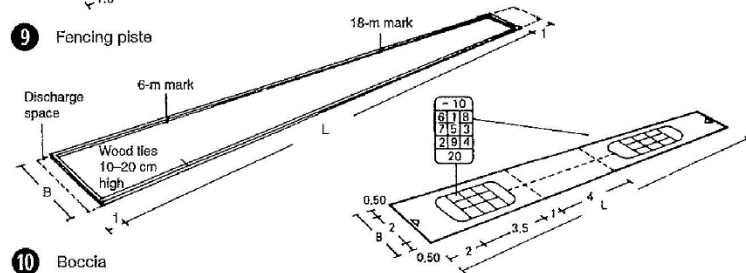


Game	max.		min.		Standard dimensions <sup>1)</sup>	
	L	W	L	W	L	W
1 School football	70	40	40	20	44	22
2 Indoor football	50	25	40	20	44	22
3 Indoor handball	—	—	—	—	44	22
4 Indoor hockey	40	20	36	18	44	22
5 Indoor netball	60	25	64	27	—	—
6 Cycle polo on grass	—	—	—	—	60	40
7 Horseshoe throwing	15	3	12	3	—	—
8 Croquet	—	—	—	—	20	4
9 Fencing piste	24	2	13	1.80	—	—
10 Boccia	—	—	—	—	24	3
11 Shuffleboard	—	—	—	—	17	3
12 Tennikoit	12.20	5.50	—	—	18.20	11.50
13 Baseball	—	—	—	—	18.29	18.29

<sup>1)</sup> including safety margin

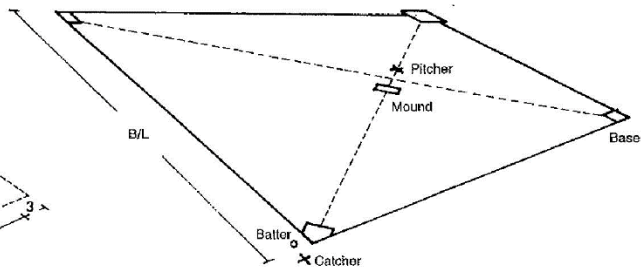


9 Fencing piste

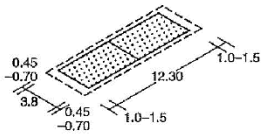


10 Boccia

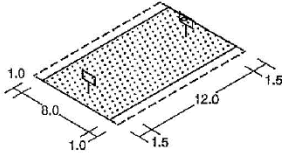
11 Shuffleboard



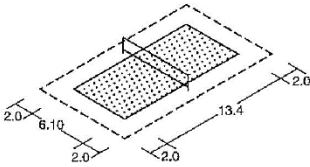
11 Shuffleboard



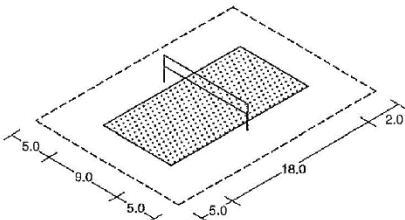
1 Beachminton



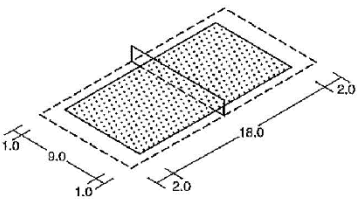
2 Beach basketball



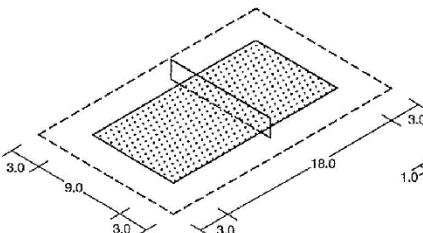
3 Beach badminton (competitive)



4 Beach volleyball (competitive)

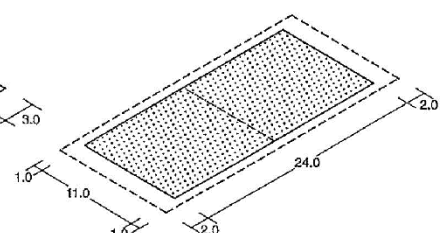


5 Beach football tennis



6 Beach handball (competitive)

8 Beach tennis (doubles)



7 Beach soccer

8 Beach tennis (doubles)

9 TAMbeach (competitive)

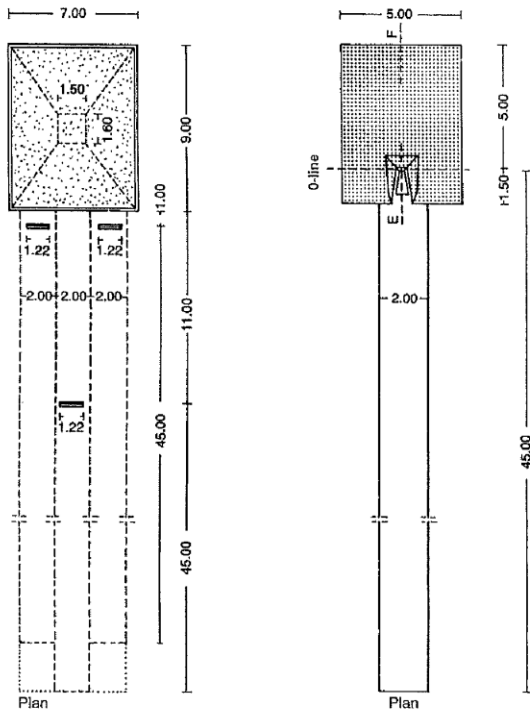
7 Dimensions of beach playing areas

Beach sport type	Competitive sport			Leisure sport			Net	Goal/basket	Sports hall	
	Size of playing area (m)	Free space around (m)		Total area (m)	Size of playing area (m)	Free space around (m)				Total area (m)
		sides (m)	ends (m)			sides (m)	ends (m)			
Volleyball	18.00 x 9.00	5.00	5.00	28.00 x 19.00	18.00 x 9.00	3.00	3.50	25.00 x 15.00	2.24 F 2.43 M	reg >5.50 nat >7.00 int >12.50
Football ("professional")	36.00 x 28.00	1.00	2.00	40.00 x 30.00	—	—	—	—	W=7.32 (C) H=2.44 (C)	—
Football ("amateur")	31.00 x 25.00	1.00	2.00	35.00 x 27.00	—	—	—	—	W=5.00 (C) H=2.00 (C)	—
—	—	—	—	—	27.00 x 12.00	1.50	1.50	30.00 x 15.00	W=3.00 H=2.00	—
Football tennis	—	—	—	—	18.00 x 9.00	1.00	2.00	22.00 x 11.00	1.30	—
Sepak takraw	18.00 x 9.00	2.00	2.00	22.00 x 13.00	12.00 x 6.00	2.00	2.00	16.00 x 10.00	1.10	—
Handball	27.00 x 12.00	3.00	3.00	33.00 x 18.00	27.00 x 12.00	1.50	1.50	30.00 x 15.00	W=3.00 H=2.00	—
Badminton	13.40 x 6.10	2.00	2.00	17.40 x 10.10	13.40 x 6.10	1.50 exceptionally, 0.30	2.00 exceptionally, 1.30	16.40 x 10.10	1.55	reg >7.00 nat >7.00 int >9.00
Beachminton	12.30 x 3.80	0.45 0.70	1.00 1.50	14.30 x 4.70 16.30 x 5.20	12.80 x 3.80	0.30	0.35	13.00 4.40	1.28	reg >5.20 nat >6.50 int >9.00
Basketball	12.00 (basket spacing)	—	—	—	15.00 x 8.00	1.00	—	15.00 x 10.00	12.00 (basket spacing)	—
Tennis (single court)	18.00 x 9.00 18.00 x 6.00	3.00 3.00	3.00 3.00	24.00 x 15.00 24.00 x 12.00	18.00 x 9.00 18.00 x 6.00	3.00 3.00	3.00 3.00	24.00 x 15.00 24.00 x 12.00	1.50 1.50	reg >7.00 <sup>1)</sup> nat >9.00 int >9.00
TAMbeach (single court)	24.00 x 11.00 24.00 x 7.50	1.00 1.00	2.00 2.00	28.00 x 13.00 28.00 x 9.50	18.00 x 9.00 18.00 x 6.00	1.00 1.00	2.00 2.00	22.00 x 11.00 22.00 x 8.00	2.10 to 2.15	—

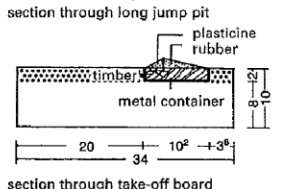
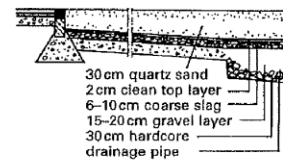
<sup>1)</sup> Regional leisure sport can take place from a hall height of 5.50 m



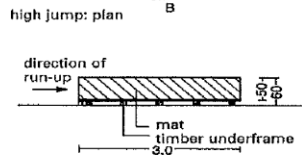
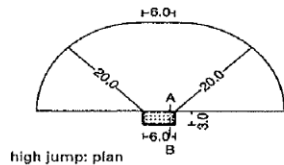
# Other Sport Facilities: Athletics



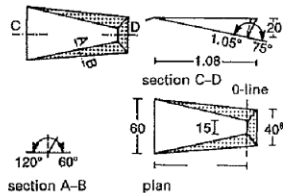
**1** Long jump and triple jump layout **2** Pole vault layout → **5**



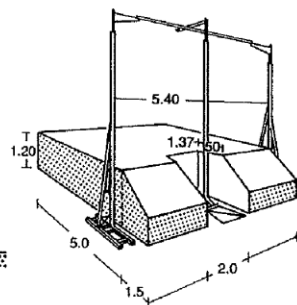
**3** Long jump and triple jump details



**4** High jump layout and details



**5** Pole vault details → **2**

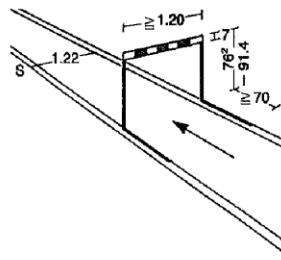


**6** Sprung stand and landing pad for section E-F → **2**

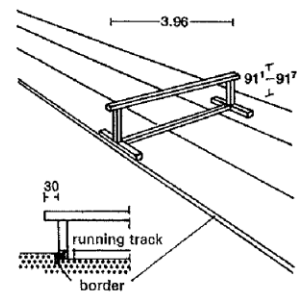
Area for:	Run-up length (m)	Width (m)	Pit (P) or landing pad (L)	Length (m)	Width (m)
long jump	≧ 45 <sup>1)</sup>	1.22 <sup>2)</sup>	P	≧ 8	2.75
triple jump	≧ 45 <sup>3)</sup>	1.22 <sup>2)</sup>	P	≧ 8	2.75
pole vault	≧ 45	1.22	LP	≧ 5	5.00
high jump	semicircle r ≧ 2.00		L	3	5-6

<sup>1)</sup> the take-off board is min. 1 m in front of the pit, because the distance between the take-off line and the end of the landing area must be at least 10 m. For high-standard layouts, the landing area is 9 m long.  
<sup>2)</sup> for multiple layouts, the width of each lane is 2 m.  
<sup>3)</sup> the take-off board is 14 m in front of the landing area (for juniors 9 m, for top athletes 13 m).

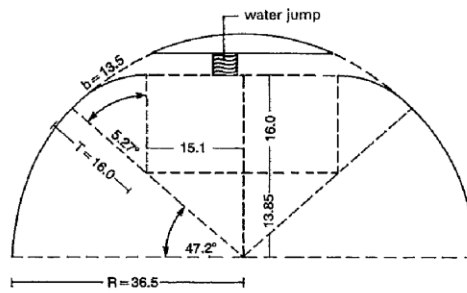
**7** Dimensions for jumping sports → **1** - **2**



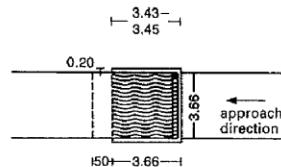
**8** Hurdle with counterweight



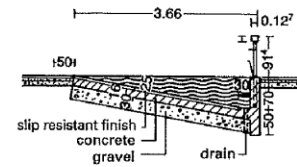
**9** Hurdle



**10** Obstacle race with 16 m radius and water trough



**11** Water jump



**12** Steeplechase water jump

Type of track	Length of start (m)	Track	Run-out	Width of each lane <sup>1)</sup>
sprint	3	110 <sup>2)</sup>	17	1.22
circular	— <sup>3)</sup>	400	17	1.22

<sup>1)</sup> the circular track needs an additional 28 cm safety zone, which does not have to be constructed as a track  
<sup>2)</sup> the length of 110 m results from the 110 m hurdles; for other sprint events the distance is 100 m  
<sup>3)</sup> no additional starting space necessary

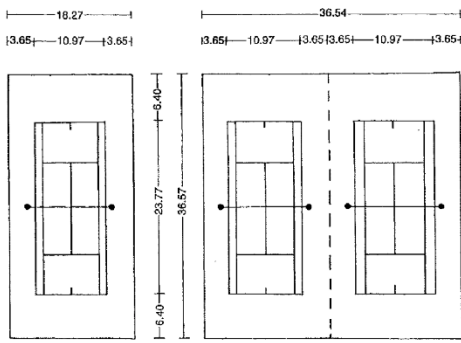
**13** Track dimensions → **8**

Track length (m)	Class	No. hurdles	Height of hurdles (m)	Distance to first hurdle (m)	Spacing of hurdles (m)	Distance after last (m)
400	Men and men, junior A + B	10	0.914	45.00	35.00	40.00
400	Women and women, junior A	10	0.762	45.00	35.00	40.00
110	Men	10	1.067	13.72	9.14	14.02
110	Men, junior A	10	0.996	13.72	8.90	16.18
110	Men, junior B	10	0.914	13.50	8.60	19.10
100	Women and women, junior A	10	0.840	13.00	8.50	10.50
100	Women, junior B (from 1984)	10	0.762	13.00	8.50	10.50
100	Women, junior B (from 1983)	10	0.840	12.00	8.00	16.00
80	Schoolboys A	8	0.840	12.00	8.00	12.00
80	Schoolgirls A	8	0.762	12.00	8.00	12.00
60	Schoolboys and schoolgirls B	6	0.762	11.50	7.50	11.00

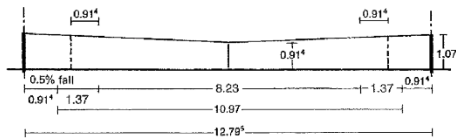
Note: a tolerance of ± 3 mm is allowed in the standard height

**14** Hurdle tracks → **8**

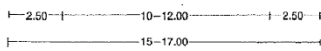
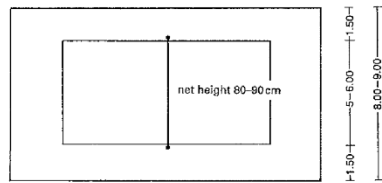
# Tennis



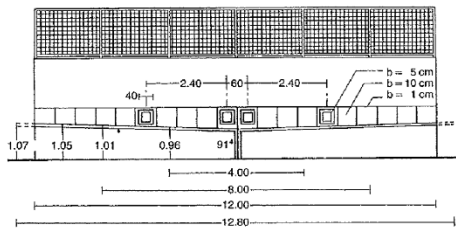
1 Tournament courts



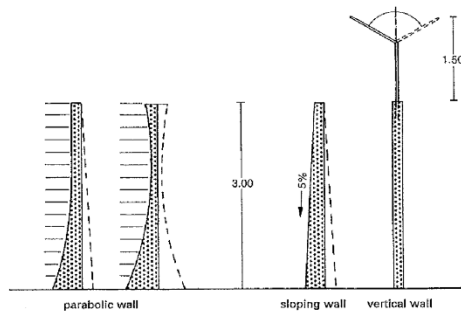
2 The net



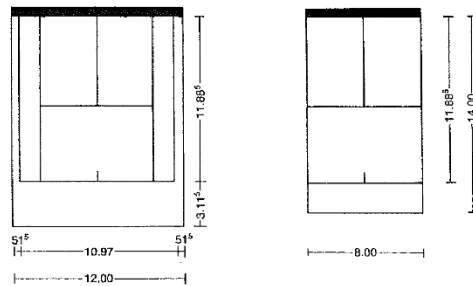
3 Children's tennis court



4 Wall marking (for serves, passing shots etc.)



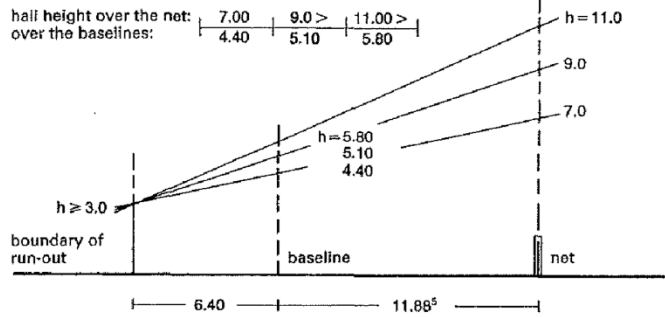
5 Types of tennis wall



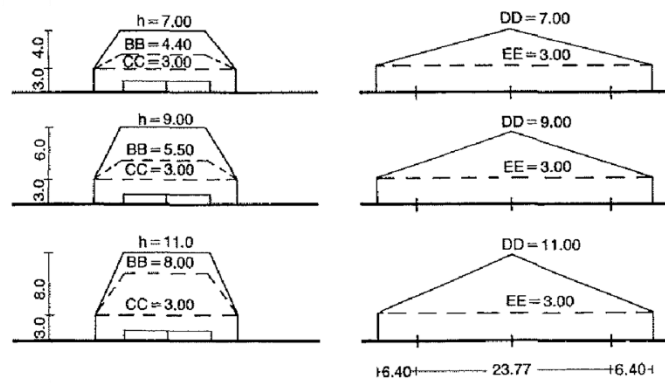
6 Training wall (doubles); shown above are recommended dimensions for tennis walls + playing area in front of wall

7 Training wall (singles)

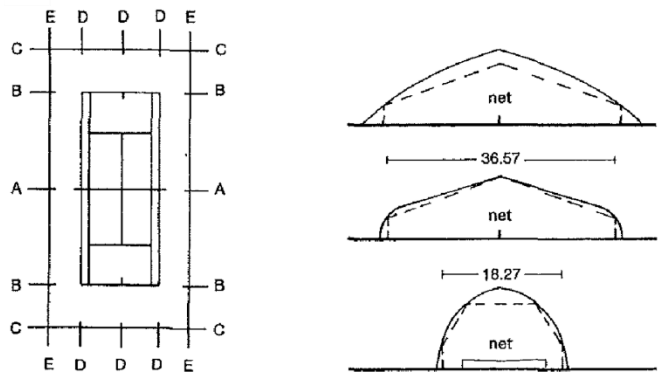
half height over the net:  $\frac{7.00}{4.40}$   $\frac{9.0}{5.10}$   $\frac{11.00}{5.80}$   
 over the baselines:



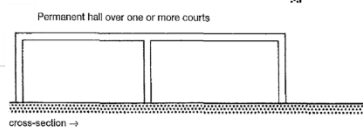
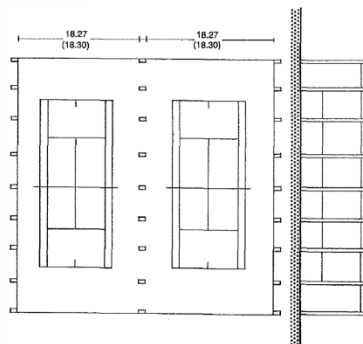
Hall heights



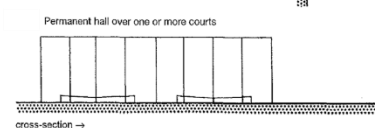
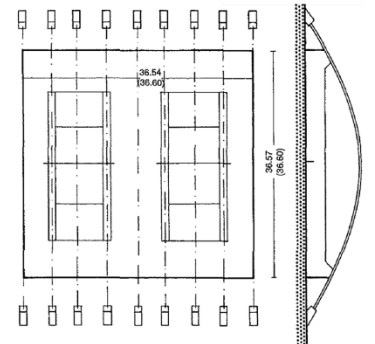
Cross- and longitudinal sections of hall types hipped on the long sides →



Ground floor plan

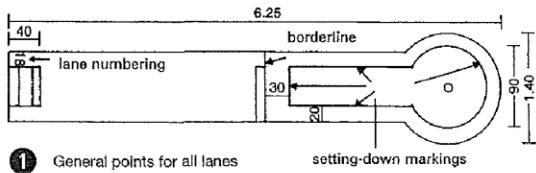


Hall dimensions and forms

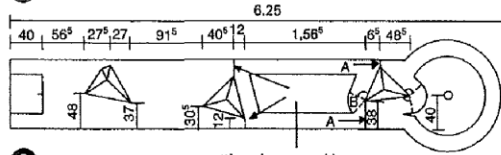




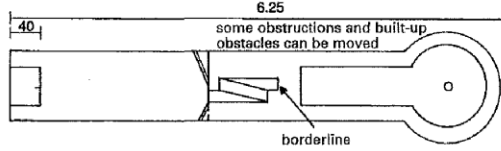
# Miniature Golf



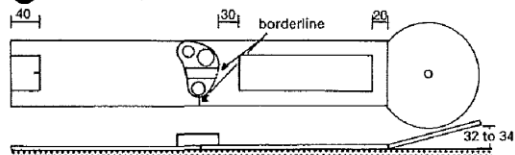
1 General points for all lanes



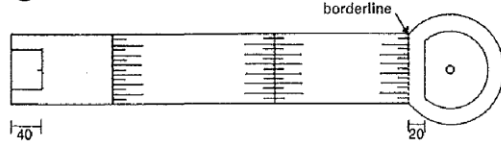
2 Pyramids



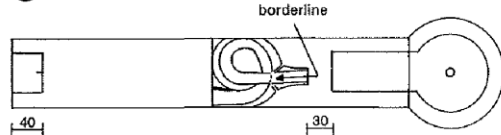
3 Somersault (with angled baffles)



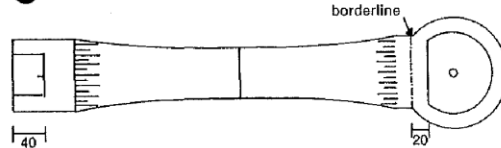
4 Sloping circle with kidney barrier



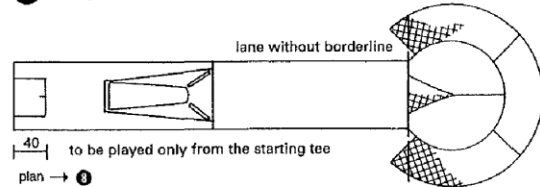
5 Floor waves



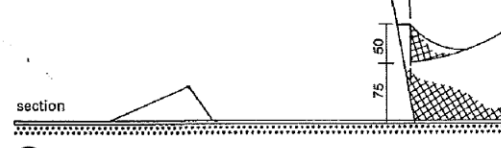
6 Flat curve



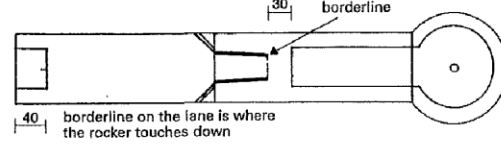
7 Bridge



8 Ski jump



9 Rocker with hoop



10 Pipe hill



11 Straight lane with staggered obstacles



12 Labyrinth



13 Blunt cone



14 Double wedges (lane without borderline)



15 Irregular passages

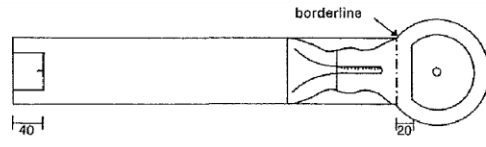
A miniature golf course is made up of 18 distinct lanes (except for driving shots), each of which is numbered and must adhere to the system's basic standards. The following are characteristics of competition-ready lanes:

- the actual playing field
- markings on the road (mostly strips)
- designating the tee
- one or more roadblocks (can be omitted)
- on the verge of (can be omitted)
- marks for laying down (can be omitted)
- hole

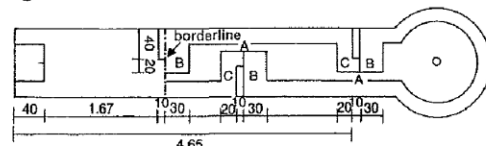
and maybe other system-specific components and/or marks

Size of the playing area: 80 cm minimum width, 5.50 m minimum length. Playing fields that are supposed to be level ought to be fully flat (90 cm spirit level). If the playing area's borders are not established by strips, they must be demarcated somehow (exception: driving shots).

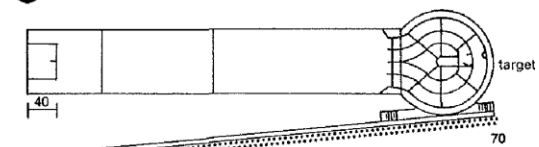
The edge strips must be put in such a way that they allow for the implementation of a strategy. A tee-off marker is required for each lane. Within a single course or for a certain lane system, the type of marking must be consistent. The impediments must be constructed and shaped virtually, and they must be permanently put (according to the sporting purpose). It's a good idea to note the locations of any barriers that aren't permanent.



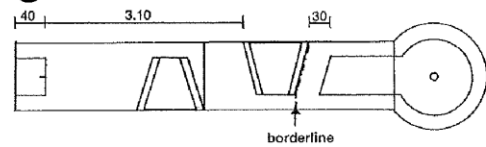
10 Pipe hill



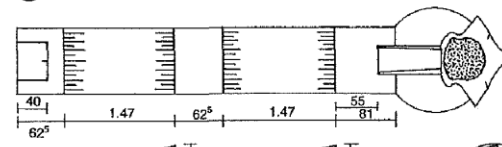
11 Straight lane with staggered obstacles



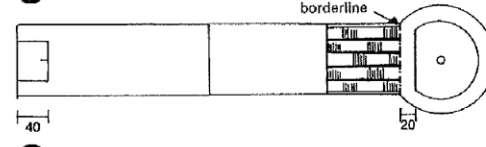
12 Labyrinth



13 Blunt cone

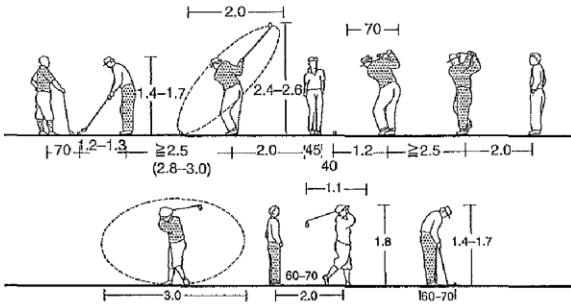


14 Double wedges (lane without borderline)

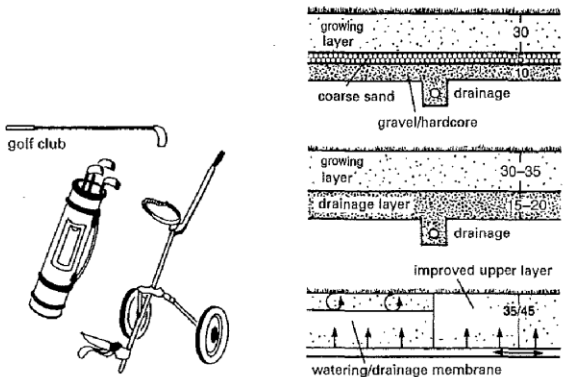


15 Irregular passages

# Golf Courses

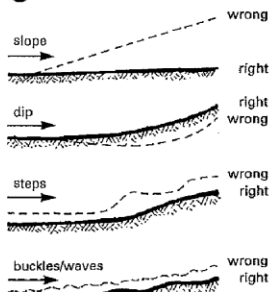


1 Space requirements for golfers

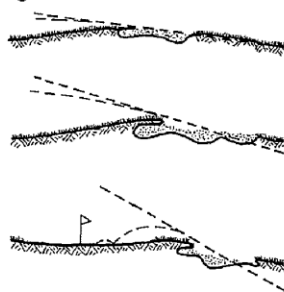


2 Golf bag with trolley

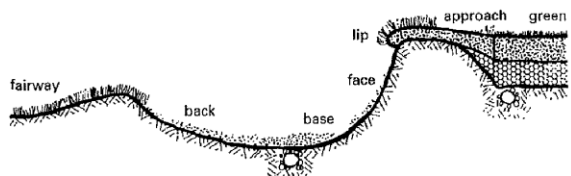
3 Construction details for types of green



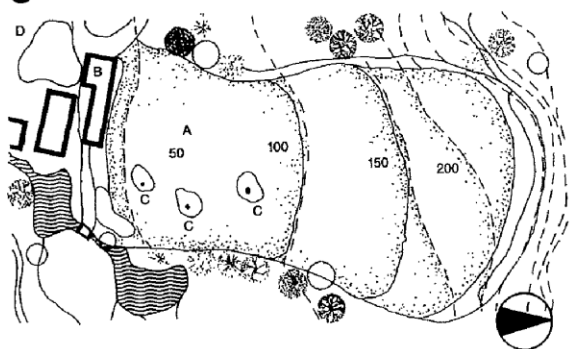
4 Surface modelling of greens



5 Bunker design, depth and shape depending on distance from green. The nearer to the green, the steeper the face



6 Section through a bunker next to a green



- A Practice green
- B Driving range hut
- C Pitching greens
- D Parking

7 Basic layout of a practice area → 9

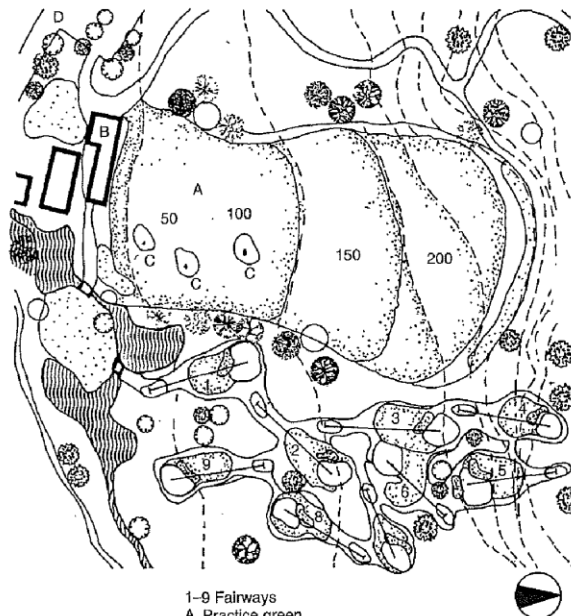
Practice areas — 70 are used for short game practice or for novices learning to play golf. A golf center as a standalone sports complex, for example, maybe built on just 10 hectares. A practice area, an approach green, a practice green, and a 9-hole golf course (par 3) — 70 would be included. The standard 60, with a usual length of 3749 meters, and the standard 74, with a normal length of 6492 meters, are the two recognized standard lengths of golf courses. The 'par' score is determined by the total lengths of golf courses.

## Elements of a golf course

The course begins at the tee, which is undefined in size. It should be around 200 m<sup>2</sup> in size and wide enough. Fairways range in size from 30 to 50 meters broad and 100 to 500 meters long. The green, which is a minimum of 400 m<sup>2</sup> but usually 500-600 m<sup>2</sup>, is located at the end of the fairway. • Aprons to the greens, which are not common everywhere, must be at least 2.5 meters wide. Roughs are regions with varying heights of vegetation near the edges of fairways and over the remaining sections. Bunkers are the most prevalent man-made barrier, however, they have the drawback of appearing like strange bodies in the landscape.

'Par'	Length of hole	
	Men	Ladies
3	up to 226 m	up to 201 m
4	229-434 m	202-382 m
5	above 435 m	above 383 m

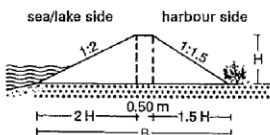
8 Golf hole lengths



- 1-9 Fairways
- A Practice green
- B Driving range hut
- C Pitching greens
- D Parking

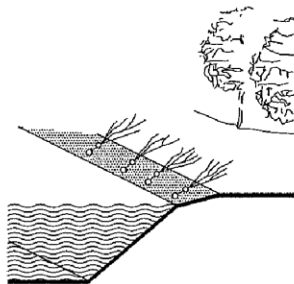
9 Extension of practice area

# Water Sport, Marinas

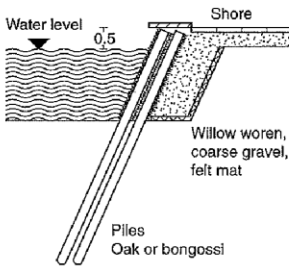


height H (m)	base width B (m)
1	4.00
2	7.50
3	11.00
4	14.50
5	18.00
6	21.50

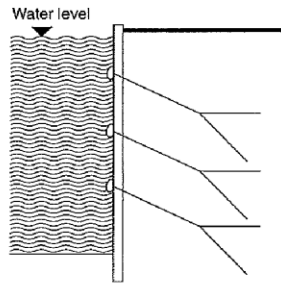
1 Sections of moles and seawalls



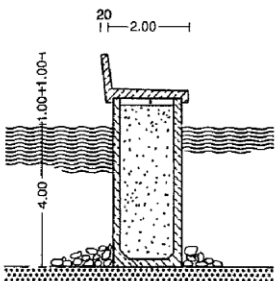
2 Reeds with at least two layers of vegetation



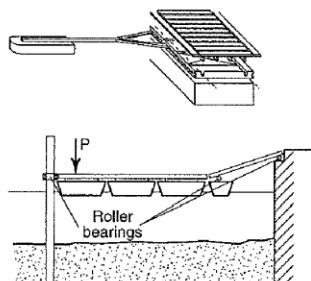
3 Rammed timber piles



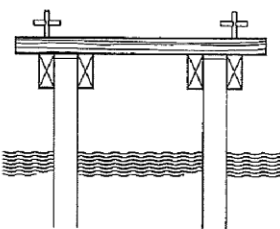
4 Sheet steel pile wall



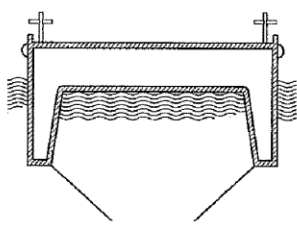
5 Pre-cast concrete caisson with sand filling



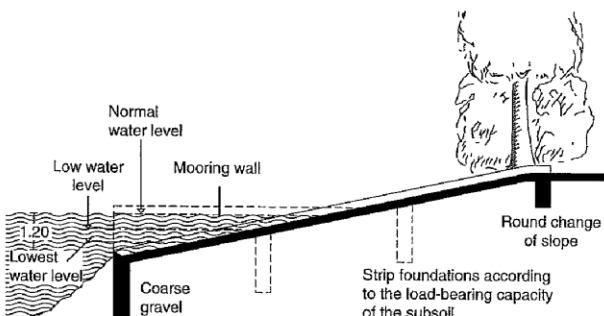
6 Section through floating pontoon, edge loading P min. 2.5 kN



7 Fixed quay of timber or concrete piles



8 Floating concrete pontoon, suitable as a breakwater



9 Section through slipway

## Marine engineering works

Structures protecting against wave impact, suction and swell are important for every marina.

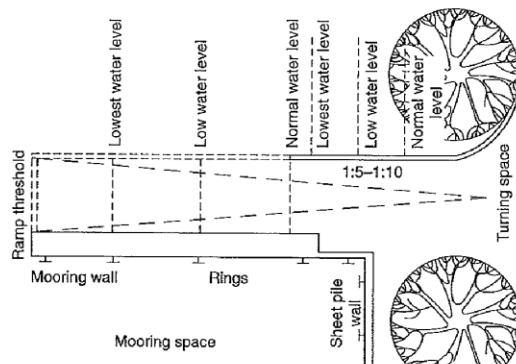
**Breakwaters** (or moles) are formed of rammed sheet piles or stone boulders --7 f) - 0. Concrete caissons can be used only in relatively shallow water. --7 0 Floating piers consisting of concrete pontoons are also possible. -7 0 Breakwaters should permit pedestrian access for sightseeing.

**Sheet pile walls** provide long-term coastal protection while taking up the least amount of space. They are usually made of rolled steel profiles that interlock vertically, although they can also be made of wood or plastic. A sheet pile wall is practically waterproof and may cover considerable distances due to the high resistance of the heavy sheet pile in situ. Fenders must be used to safeguard sport boats that are moored against a sheet piling wall from mechanical damage. Steel piling walls can corrode, which is undesirable in a marina.

**Dolphins** consist of steel pipes, sometimes filled with concrete or timber. Depending on the seafloor, the minimum length is 3 times the water depth. Dolphins are attached to boats and quays. Timber dolphins have a 15-year lifespan in seawater, but steel pipes have a 35-year lifespan. Because this lifetime varies so much depending on where you live, you should look for information locally.

**Banks** are made of rubble, concrete, or planting and serve to stabilize beaches. The height, ground conditions, and detailing all affect the slope.

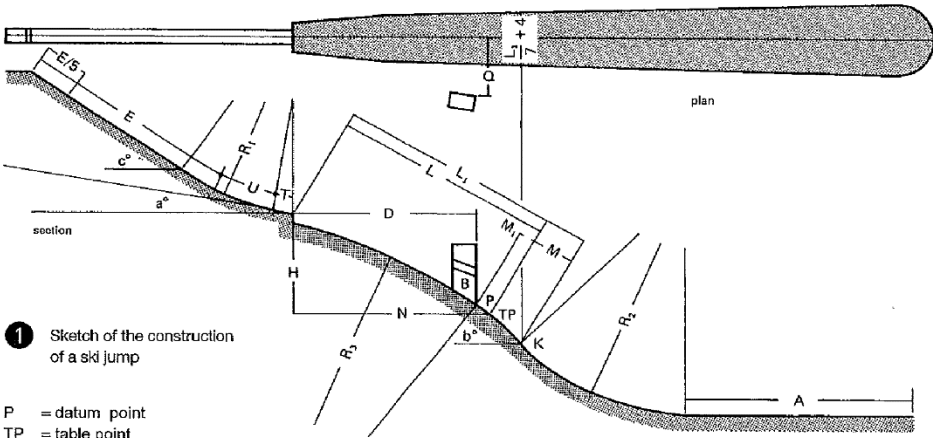
**Cranes and slipways** boat cranes can be stationary or movable, depending on whether they are permanently installed in the service dock area. According to the size of the crane and the boat, load-bearing ground and adequate space for landside access (vehicle with trailer truck) are required. In this area, coastal protection will have to be vertical.



10 Plan → 9



# Ski Jumping



1 Sketch of the construction of a ski jump

- P = datum point
- TP = table point
- K = critical point (end of section where slope is parallel to the flight path)
- B = end of the landing track curve
- M = slow-down section (distance from P to K)
- M<sub>1</sub> = distance from P to B
- L = distance from edge of slope to P
- L<sub>1</sub> = distance from edge of slope to K
- H = vertical projection of L
- N = horizontal projection of L
- H:N = ratio of vertical to horizontal
- a = slope of launch platform
- b = slope of landing track from normal point (P) to critical point (K)
- c = slope of starting ramp
- R<sub>1</sub> = radius of curve from starting ramp to launch platform
- R<sub>2</sub> = radius of curve from landing track to run-out
- R<sub>3</sub> = radius of curve from launch platform to landing track
- T = length of launch platform
- U = part of starting ramp, in which speed no longer increases
- E = part of starting ramp, in which speed increases
- F = total length of starting ramp (F = U + E + T)
- A = length of run-out
- V<sub>0</sub> = speed at launch platform in m/s
- D = horizontal distance from launch platform to lower edge of judge's tower
- Q = distance from the landing track axis to front edge of judge's tower

2 These symbols should be used

medium and large ski jumps											
E			L						8-10°		
c	c	c	9-12°								← a
30°	35°	40°	U	T	V <sub>0</sub>	H:N = 0.56	0.54	0.52	0.50	0.48	b ↓
62	52	44	8.8	4.6	21				53.0	51.0	35-37°
71	58	49	9.7	4.8	22	65.3	63.0	60.8	58.5	56.2	
80	65	54	10.6	5.1	23	71.5	69.0	66.5	64.0	61.5	36-38°
89	72	60	11.4	5.3	24	77.7	75.0	72.2	69.5	66.7	
99	80	67	12.5	5.5	25	84.0	81.0	78.0	75.0	72.0	37-39°
111	90	74	14.0	5.7	26	90.2	87.0	83.7	80.5	77.2	
124	100	81	15.0	5.9	27	96.3	93.0	89.5	86.0	82.5	38-40°
137	110	88	16.0	6.2	28				91.5	87.7	

3 Dimensions of medium and large ski jumps

small ski jumps												
E			L						← a			
c	c	c	B-10°			7-9°			6-8°			
30°	35°	40°	U	T	V <sub>0</sub>	H:N = 0.50	0.48	0.46	0.44	0.42	0.40	b ↓
26	23	21	4.5	3.3	15	20.0	19.5	19.0	18.5	18.0	17.5	30-34°
32	28	25	5.1	3.5	16	25.5	24.8	24.0	23.3	22.5	21.8	30-35°
39	32	28	5.8	3.7	17	31.0	30.0	29.0	28.0	27.0	26.0	33-36°
46	37	32	6.5	4.0	18	36.5	35.3	34.0	32.8	31.5	30.3	33-36°
52	43	37	7.2	4.2	19	42.0	40.5	39.0	37.5	36.0	34.5	34-37°
59	49	42	8.0	4.4	20	47.5	45.8	44.0	42.3	40.5	38.8	34-37°

4 Dimensions of small ski jumps

Example: according to the terrain, the following details were given for L<sub>1</sub> and H:N, for example H:N = 0.54; c = 35°; L = 87 m.

In the table, you can find: L = 87 and in the left column V<sub>0</sub> = 26; at the same level under c = 35°, E = 90 m, U = 14 and T = 5.7; F = E + U + T = 90 + 14 + 5.7 = 109.7 m.

A ski jump which has dimensions different from the above can be approved by the FIS. In such a case, the designer of the ski jump must provide a detailed justification in writing.

The distance from the horizontal 'd' through the apex of the ski jump to the parapeet of the lowest judge's cabin =  $D \times \tan 16^\circ - \tan 20^\circ$ . The cabins should be set as steps along a sloping line that runs from the ski jump table edge to the point 'd'. The separate cabins' upper border of the floor is 1-1.20 m below the parapeet.

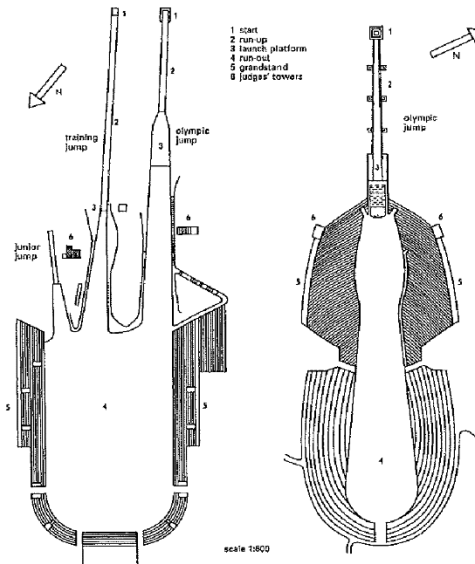
The judge should be able to see the whole flight and landing by sloping the tower 7-10 degrees away from the track axis. As many beginning sites as feasible should be equally dispersed along the length E/5, with a vertical spacing of around 1 m, at the top of the starting ramp. E-E/8 is the lowest starting position.

Minimum width of the landing piste at K =  $L_1/7 + 4$  m.

Note:

All slopes must be expressed in old divisions (360°). If the transfers are parabolic, the parabolas' smallest curves are R<sub>1</sub> and R<sub>2</sub>. If the beginning ramp is natural, the sections that are really utilized should be marked every 2m to make determining the exact starting point easier. The slope of the ski jump table, as well as a number of places on the curve between the beginning ramp and the ski jump table's tip, should be defined on both sides with set profiles, so that even non-experts may create the jump with the precise and right profile.

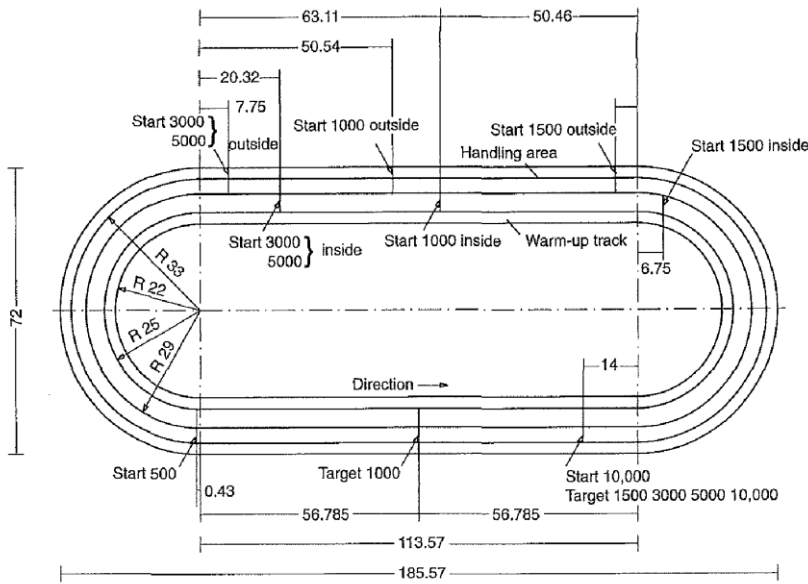
5 The data point of a ski jump is to be determined



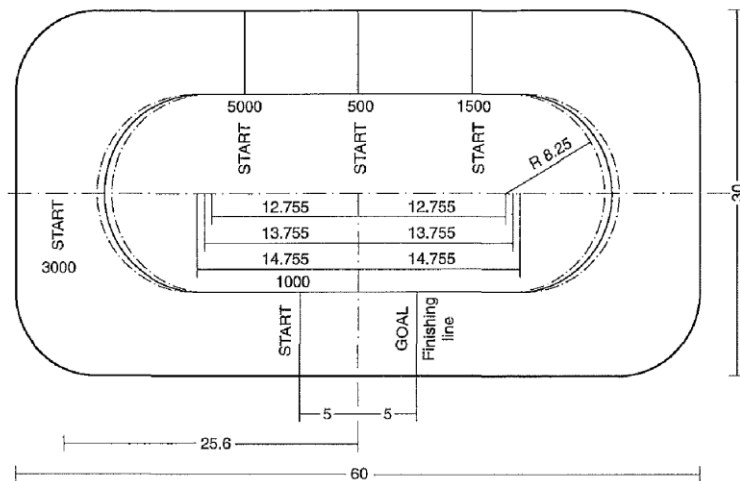
6 Garmisch-Partenkirchen

7 Holmenkollen

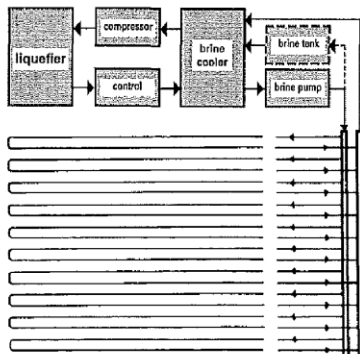
# Ice Rinks



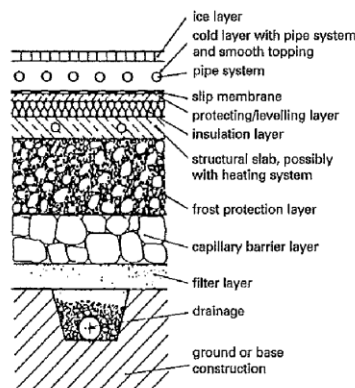
1 Standard ice racing rink with marking



2 Plan for short track



3 Artificial ice rink: scheme for a cooling plant (brine operation)



4 Laid pipes → 3

Skating, ice hockey, and curling can all be done on ice rinks, but they can also be done on naturally frozen lakes and rivers, as well as frozen open-air swimming pools (the edge must be strong enough to resist ice pressure).

**Sprayed ice rinks** can be created on tennis courts, roller skating rinks and other large flat areas (surrounding wall about 10-15 em). Water is sprayed 2 em thick; drainage will be needed for water run-off.

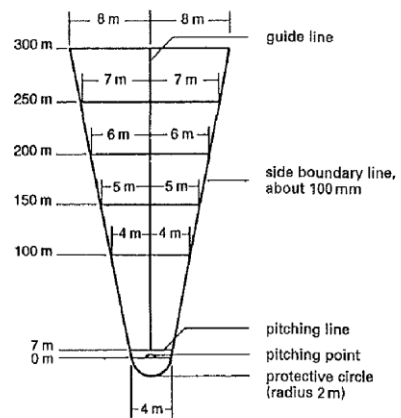
**Artificial ice rinks** with cooling pipe system, 2.5 em under screed layer. Pump system with deep-frozen salt solution or chambers with cold air (mostly ammonia compression process) -> 8-e.

## Standard ice racing track

A circular track should be 4 meters wide; the inside warming-up track should be 3 meters wide (but 4 meters is preferred for optimal training).

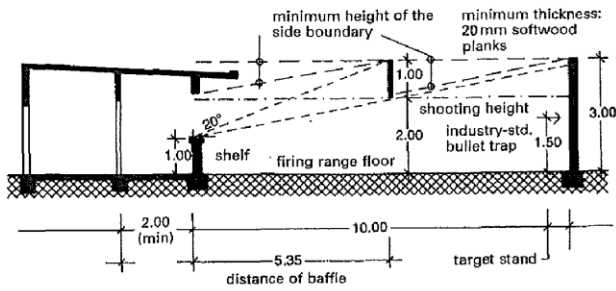
**Bob's tracks** are made up of ice chunks with steeply banked turns. Spectator areas should preferably be within curves, but if not, they should be protected by snow or straw bales.

**Toboggan tracks** lie on N-NW-NE slopes, ideally in a hollow. Length 1500-2500 m; slope 15-25%; width ;;;2m. Flat run-out or uphill section, banking of curves and protection of obstacles with straw bales or snow walls. Climbing up not on the track but next to it.

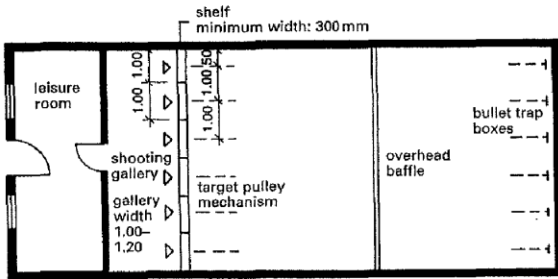


5 Long curling rink → p. 345

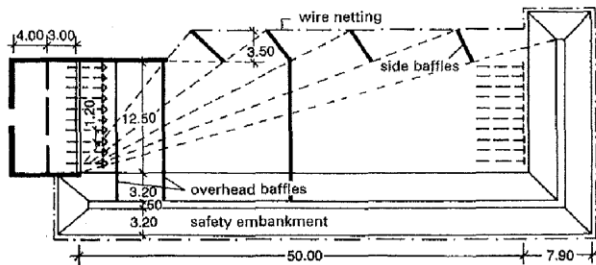
# Shooting Ranges



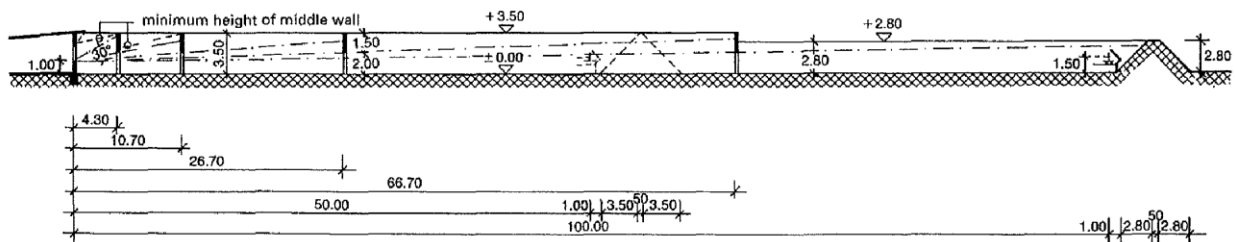
1 Section → 2



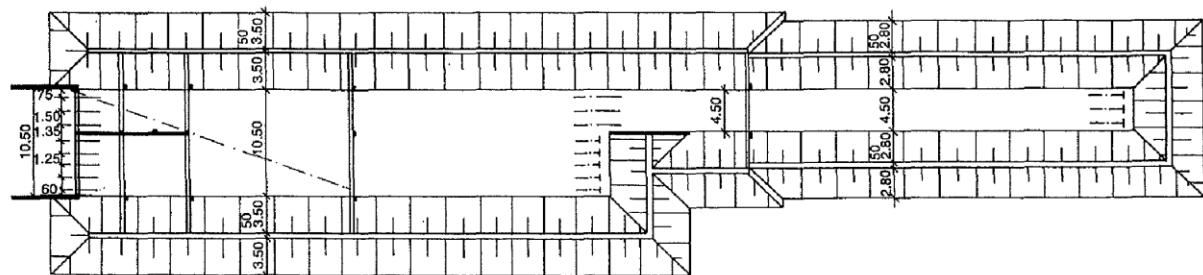
2 Shooting range for air pressure and CO<sub>2</sub> guns, covered shooting gallery, open-air range



3 Small-calibre range for target-pulling



4 Cross-section → 5



5 Combined 100 m range for all rifles and a 50 m small-calibre range → 4

**Location:** if feasible, in a ravine within a wooded region with a surrounding hillside to naturally collect bullets, away from public highways and buildings. Buildings can also house shooting ranges, such as in conjunction with public multi-purpose sports halls. Air gun ranges, handgun ranges, and small caliber ranges are all common categories.

The German Shooting Association's 'Guidelines for the design and acceptance of shooting ranges for sporting and hunting shooting' spell out the safety standards. Aside from the usual permissions for the construction of a shooting range, a report from an accredited shooting range specialist is also necessary. The right of 'neighbors' to raise objections based on noise nuisance is generally upheld. Safety structures such as overhead baffles, side protection (walls or earth banks), and range closing must be created with certified building materials or evaluated by an expert.

## Shooting programme

Olympic competitions: x = for men, xx = for women and men, xxx =only for women.

**Rifle shooting:** air rifle 10 m xx; Zimmerstutzen rifle 15 m; small-calibre rifle 50 m x; KK standard rifle xxx; sport rifle 1 00 m; large-calibre rifle 300 m; GK standard rifle 300 m.

**Pistol shooting:** air pistol 10 m xx; Olympic quick-fire pistol 25 m x; sport pistol 25 m xxx; standard pistol 25 m, free pistol 50 m x.

**Clay pigeon shooting:** trap shooting x; skeet shooting x. Running target: moving boar, 1 0 m and 50 m x. Archery: hall conditions, international conditions xx, field bow.

**Crossbow:** national conditions, international conditions 10 and 30m.

**Muzzle loader shooting:** national conditions.



# Water sport, rowing and canoeing

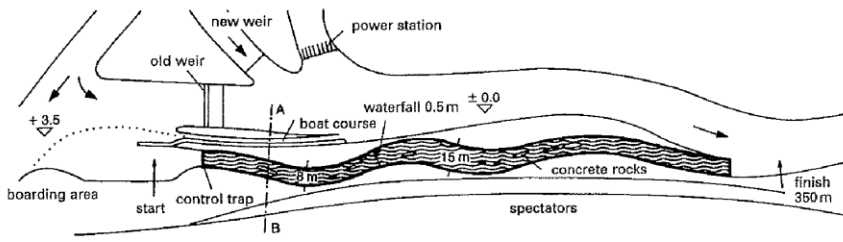
Requirements for regatta and training courses for canoe and slalom:

**1. Natural facilities:** In steep sections (min. 1:100 gradient) of waterways not suitable for normal boating traffic or similar rivers with min. 10 m<sup>3</sup>/s flow (at mean low water or as controlled by an upstream weir). Also in tailwater from mills and power stations, min. 8 m wide, with and without obstacles (installation of gates)

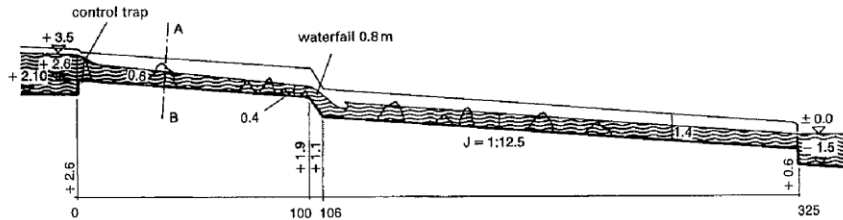
**2. Artificial facilities:** Olympic course in the Eiskanal/Lech near Augsburg, 550 m long. Reinforced concrete channel with concrete rock obstacles and 6 m falls, invert waterfall, up to 32 gates.

Requirements for regatta and training courses for competitive international rowing and canoeing .

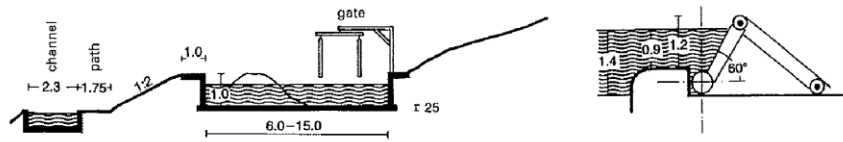
Minimum requirements for water touring courses . Criteria for water touring rest places and canoe stations are laid down by the DKV (German Canoe Association).



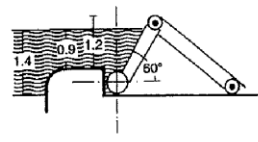
1 Regatta course for canoe slalom



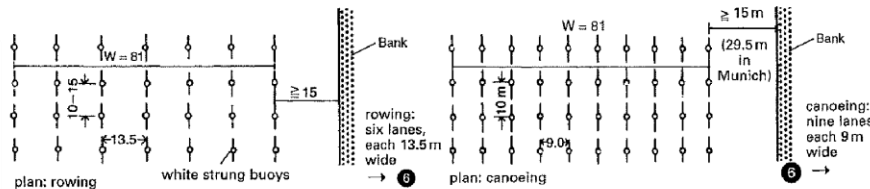
2 Horizontal section → 1



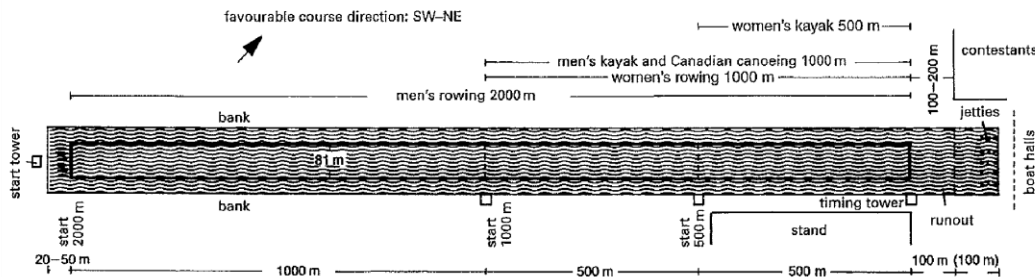
3 Cross-section → 1



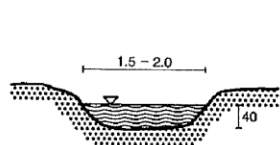
4 Control trap with draining base



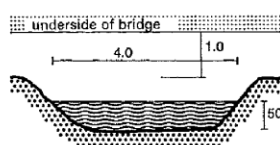
5 Track markings (international dimensions) for competitive rowing and canoeing



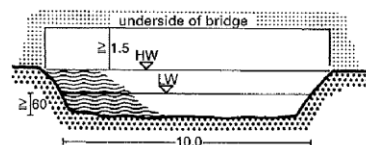
6 Regatta course in Munich (international dimensions) for competitive rowing and canoeing



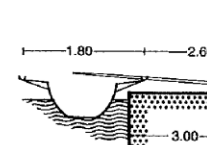
7 Waterway for touring, 1000 l/min.



8 Waterway for touring, normal



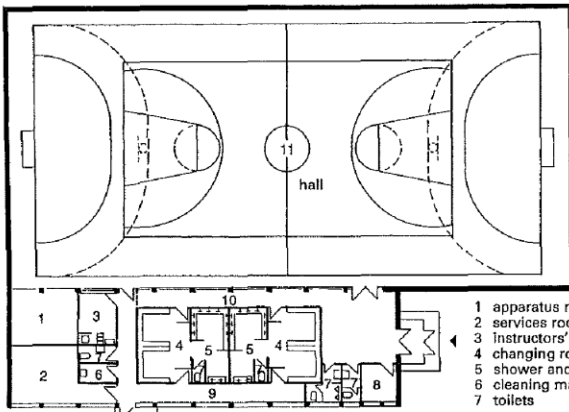
9 Waterway



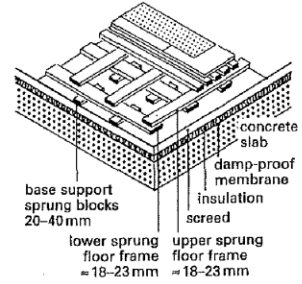
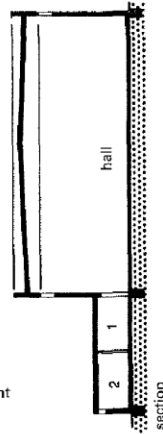
10 Jetty, min. length ≥ 7.0 m

# Sports Halls:

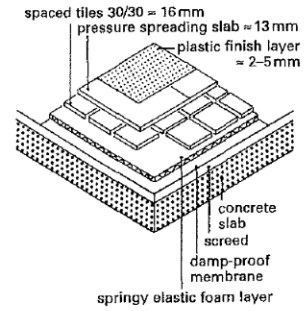
## Layout, construction



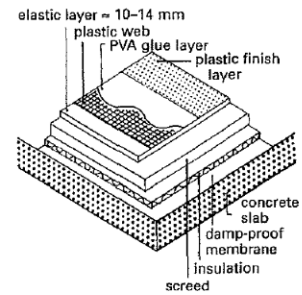
1 Schematic plan of sports hall



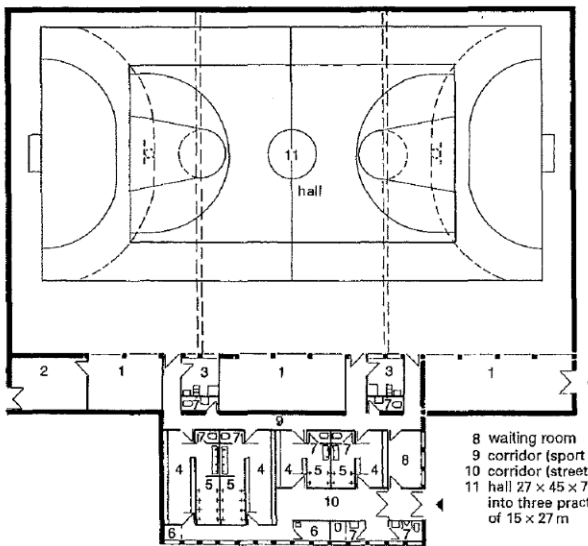
7 Sprung floor construction



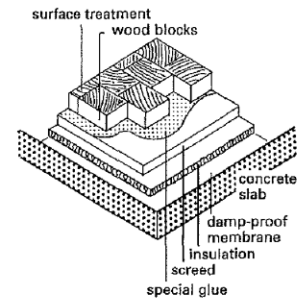
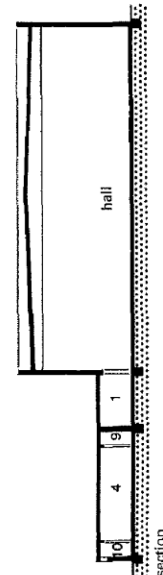
8 Flexible floor construction



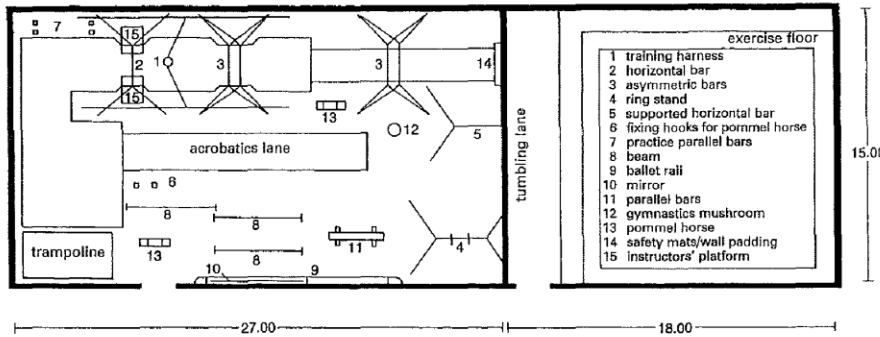
9 Impact-absorbing floor construction



2 Schematic plan of a triple sports hall

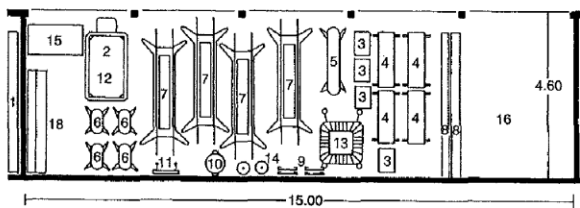


10 Construction detail for wood-block flooring – laid rectangularly with surface treatment

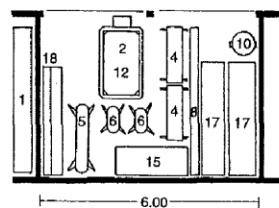


3 Gymnastic apparatus hall 15 x 27 m with floor gymnastics hall 15 x 18 m

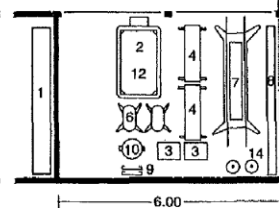
- |                      |                        |                         |                        |                        |                                  |
|----------------------|------------------------|-------------------------|------------------------|------------------------|----------------------------------|
| 1 equipment cupboard | 4 large vaulting box   | 7 parallel bars         | 10 magnesia holder     | 13 small trampoline    | 16 area for additional apparatus |
| 2 trolley            | 5 vaulting horse       | 8 gym bench             | 11 handstand bars      | 14 jump stands         | 17 handball equipment            |
| 3 small vaulting box | 6 small vaulting horse | 9 springboard (springs) | 12 gym mats on trolley | 15 floor exercise mats | 18 soft floor mats               |



4 Arrangement plan for large equipment in the apparatus storeroom of a 15 x 27 m sports hall

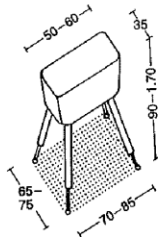


5 Equipment room

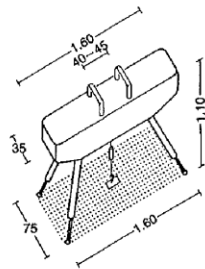


6 Equipment room

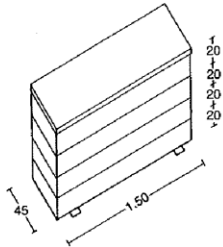
# Equipment



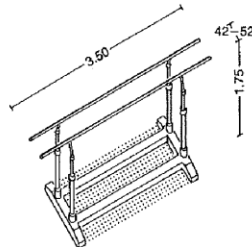
1 Vaulting horse



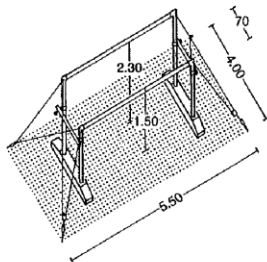
2 Pommel horse



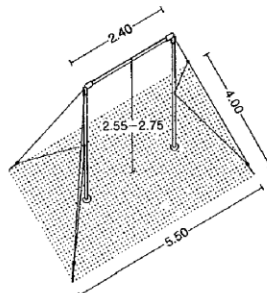
3 Vaulting horse



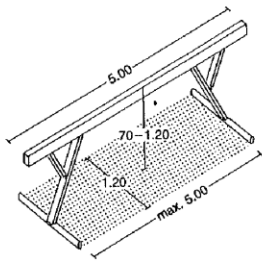
4 Parallel bars



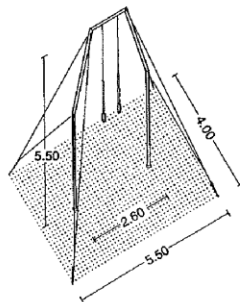
5 Asymmetric bars



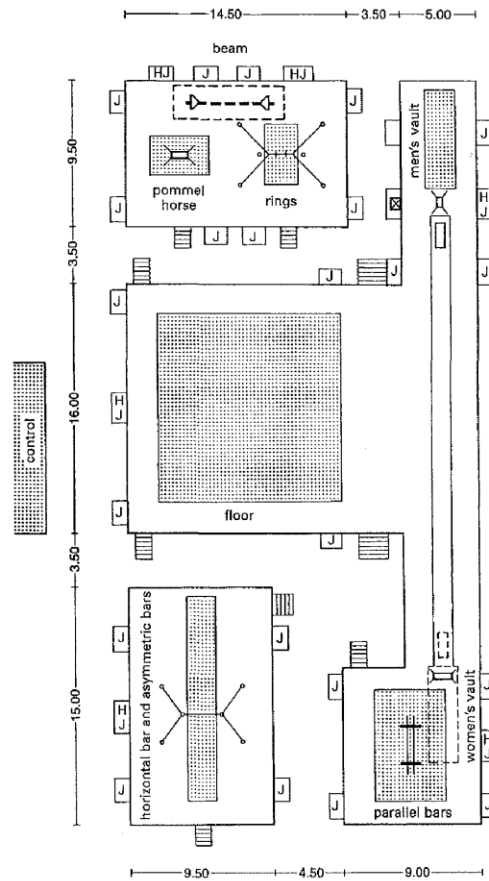
6 Horizontal bar



7 Beam

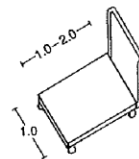


8 Rings support frame

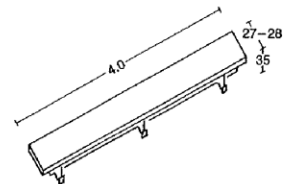


J = judge  
HJ = head judge

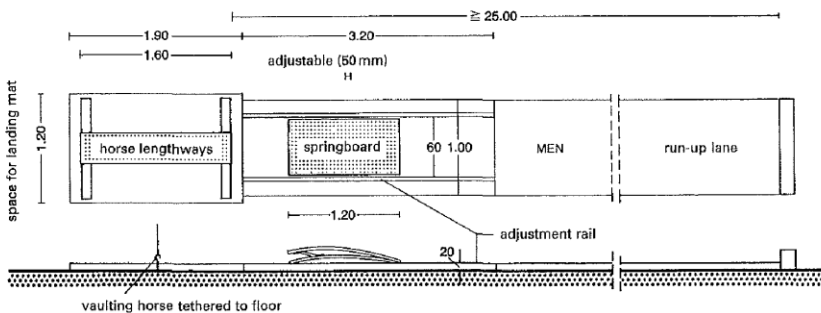
10 Competition podium, space requirements: dimensions of podium, arrangement of judges' places



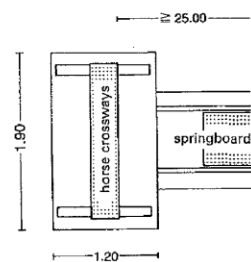
11 Mat trolley



12 Gymnastics bench



9 Vaulting layout, men

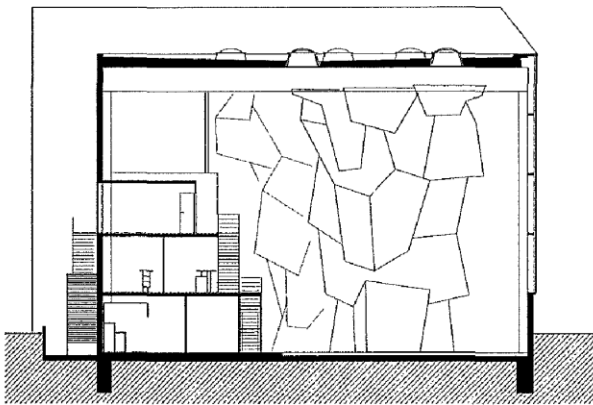


13 Vaulting layout, women

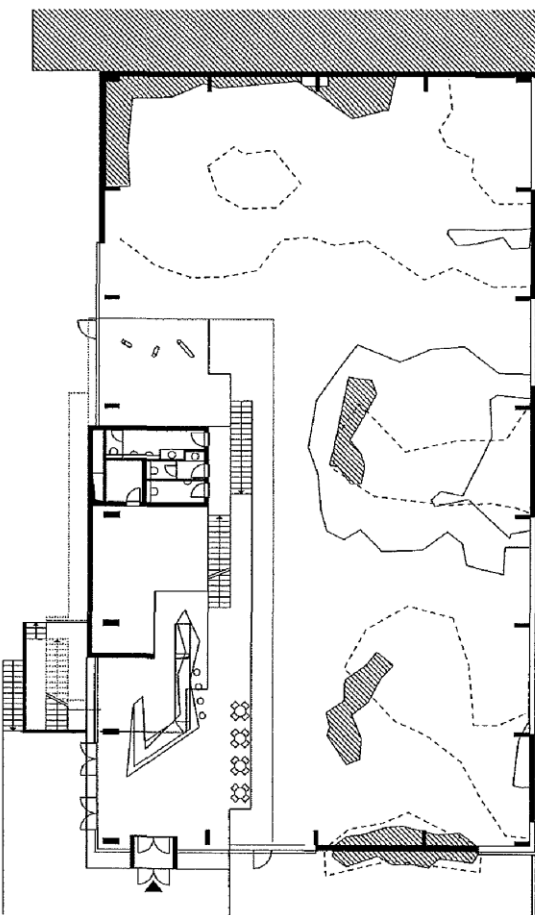
# Climbing halls

Construction	Description	Properties
solid concrete (formwork)	compact standing concrete panels with positive and negative structures	sharp edges, additional grips, variable surface design is possible
shotcrete	mesh of steel wires (reinforcement) sprayed with concrete.	organic shapes can be bolted on subsequently, only for outdoor walls
timber	timber-based boards with or without coating bolted directly to an internal wall or onto a support construction	install numerous drilled holes. Projecting and recessed grips can be installed cheaply
GRP (glass fibre-reinforced plastic)	boards or various shapes made of GRP can be bolted directly to an internal wall or onto a support construction	natural surface, various surface-fixed or recessed grips are possible. Disposal could be a problem

1 Climbing wall construction types (Deutscher Alpenverein → refs)



2 Magic Mountain climbing hall, Berlin, section Arch.: Gantz Weber Architects



3 Magic Mountain climbing hall, Berlin, ground floor Arch.: Gantz Weber Architects

Climbing halls make climbing possible all year round, whatever the weather. The size and shape of halls is variable depending on the operator's ideas and space available (up to 2500 m<sup>2</sup> indoor area).

Concentrating the subsidiary functions is practical in order to keep a large part of the area for climbing. The entrance with reception and cash desk can be supplemented by a cafeteria and shop for climbing equipment.

Sanitary facilities are similar to those in a fitness centre. Sensible additions would be a steam bath/sauna with rest zone, possibly also a fitness area.

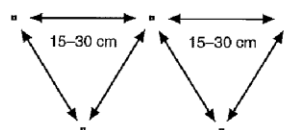
A high degree of daylight is desirable (smoke extraction domes as daylight sources) and artificial light should only be indirect to avoid dazzling of climbers and safety staff. Climbing walls must be regularly maintained by an expert according to the manufacturer's recommendations.

Types of climbing wall:

**Boulder wall:** This is climbed at low height without safety ropes. The climbers move horizontally ('traverse') or 'boulder' short stretches upwards. The wall can be climbed without supervision. There must be a jumping-off area of gravel, bark mulch or mats.

**Top rope or lead wall:** Roping is necessary on account of the height. The climbers mainly climb upwards and, at the top of the wall, are let down by a climbing partner or abseil themselves. It is also possible to boulder at the foot of this wall and it must be secured against unsupervised climbing. No grip should be reachable up to a height of 2.5 m. If a top rope or lead wall is in a sports hall, the requirements for sport operation in sports halls still have to be met.

Climbing walls are modelled on natural rock faces in their surface and design. The color scheme is variable and often in accord with a CI scheme. Dimensions and shape are flexible. The height for sport climbing is up to 18m, exceptionally to 30m. Climbing walls are built by specialist firms and are offered as a buildingblock system or as a free design of the climbing area.



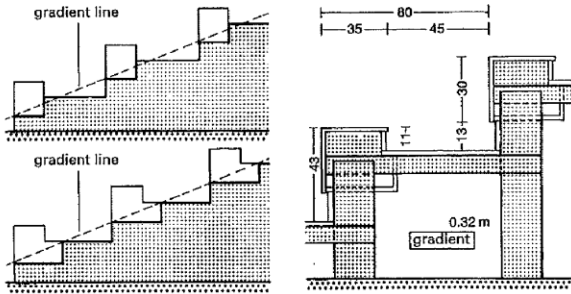
4 Grip pattern staggered (or square) (Deutscher Alpenverein → refs)

Climbing standard	Children, young people	Adult beginners	Normal	Training
grips/m <sup>2</sup>	8-10	4-8	3-5	>10

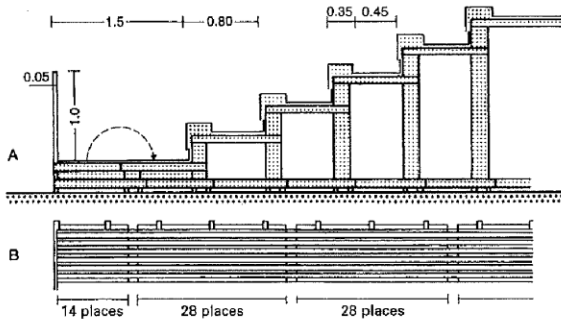
5 Number of grips/m<sup>2</sup> according to user group (Deutscher Alpenverein → refs)



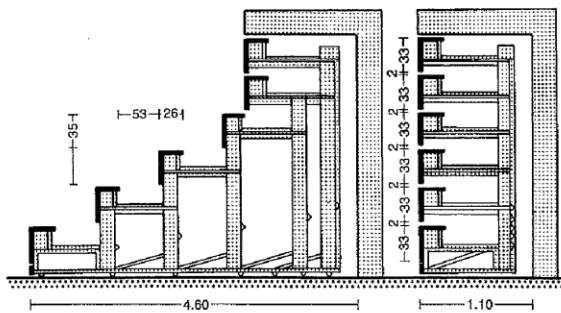
# Stands



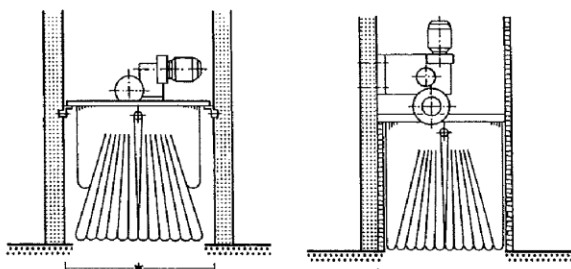
**1** Schematic section through access steps  
**2** Section through stepped seating with access steps behind



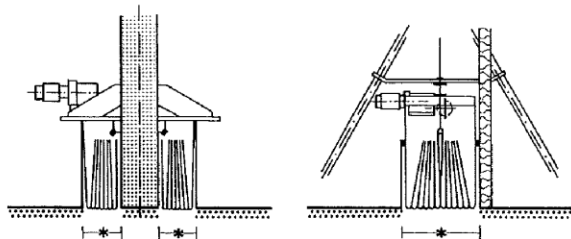
**3** Stand with access from below (A); stand with access from above (B)



**4** Retractable stand, length  $\leq 6.0$  m



**5** Partition curtain between two beams  
**6** Side view of partition curtain at beam, with sound absorption recess



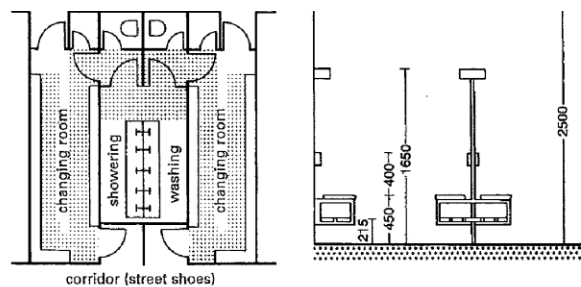
\* - width, depending on height of hall and thickness of material  
**7** Partition curtain both sides of a beam  
**8** Partition curtain with pulley system mounted in sound-absorbing recess inside a space frame

Spectator stands ----> (1-4) can be fixed or mobile. For smaller installations with up to 10 rows of seats, a linear rise of the seats (height 0.28-0.32 m) can be assumed. All other installations should have a parabolic rise (height for seats 1.25 m, standing places 1.65 m), sightline rise for seats 0.15 m, standing places 0.12 m. Row spacing for seats 0.80-0.85 m ----> (2 - 3). For standing places, 0.4-0.45 m. Sightline origin point 0.5 m above the boundary marking of the playing area.

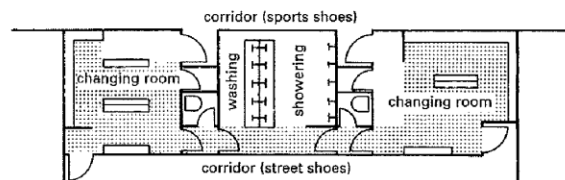
Protect spectator places behind goals with mobile catch nets. Seats in upper levels and galleries should be closed off with nets while practice matches are underway. For the group of rooms including entrance hall, changing and sanitary facilities, teachers' room, additional sport room and hall, it is recommended to arrange a separation of the routeing of people wearing street shoes and sports shoes ----> 9 - 12. Showers must be immediately accessible from changing rooms, with a drying area between the wet area of the shower room and the changing room. Shower rooms divided into two room units must be connected to the two adjacent changing rooms so that one or both of the room units can be used from either of the changing rooms ----> 9 - 12. Teachers' rooms should be near the changing rooms. The first aid room must be on the same level as the sports area and can be integrated into the teachers' room.

Spectator stands can generally be accessed from below or above; from below leads to lower costs (spending on stairs and access galleries is saved), but this is disadvantageous for the organisation of events because of visitors passing the base of the stand, disturbing competitors and existing spectators ----> 3. Free sides should be protected by >1 m high barriers, measured from the traffic surface.

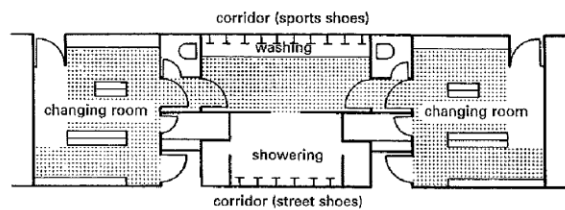
The design of the wall and ceiling area next to the partition must ensure that no noise transfer takes place when the partition is down ----> (5 - 8)



**9** Example 1  
**10** Cloakroom seating as wall-mounted and double bench

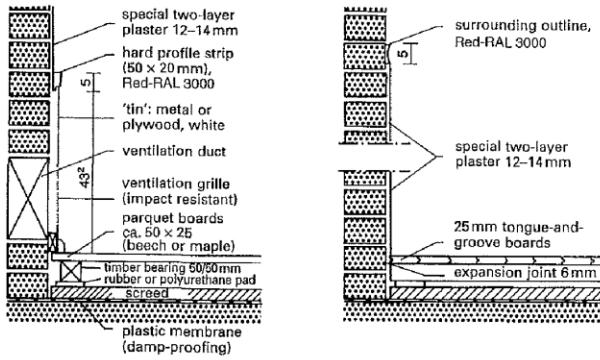


**11** Example 2



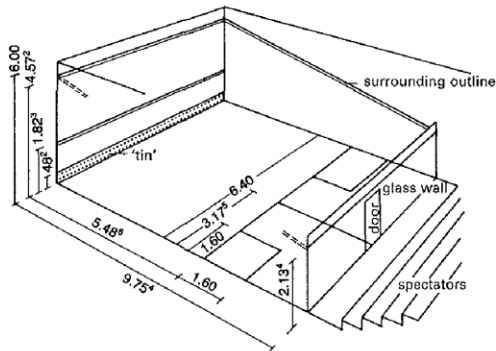
**12** Example 3 Three proposed solutions for the changing and sanitary facilities (shaded: floor areas laid with PVC grid mats)

## Other sports

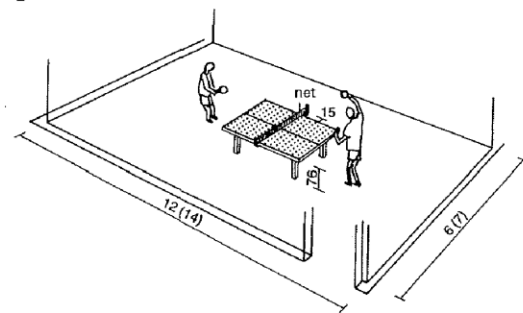


1 Squash court end wall

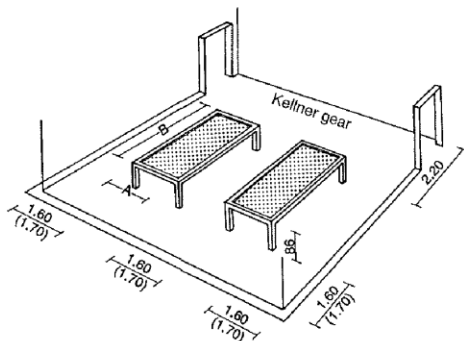
2 Squash court side wall



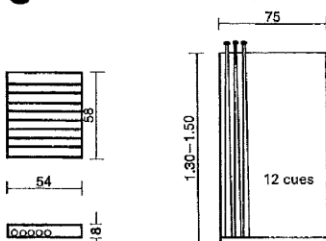
3 Basic dimensions for squash court



4 Basic dimensions for table tennis



5 Basic dimensions and spacings for billiards



6 Ball cupboard

7 Cue rack

8 Usual billiards table sizes

Normal table size (dimensions in cm)		I	II	III	IV	V	VI
Internal (playing area)	A	285 × 142 <sup>5</sup>	230 × 115	220 × 110	220 × 100	200 × 100	190 × 95
external	B	310 × 167 <sup>5</sup>	255 × 140	245 × 135	225 × 125	225 × 125	215 × 120
room		575 × 432 <sup>5</sup>	520 × 405	510 × 400	500 × 395	490 × 390	480 × 385
weight (kg)		800	600	550	500	450	350

## JUDO

Soft, springy mats cover the contest surface, which is 6 x 6 m to 10 x 10 m or 66 x 12 m. The contest area should be greater than 10 x 10 for German championships and international tournaments. It is not permitted to use upholstered mats. The mats should be lifted 15 cm in the ideal situation. The contest area and the surrounding region should be clearly separated by a separating line.

## WRESTLING

For competitions, the mat size should be 5 x 5 m; for German championships and international competitions, the mat size should be >6 x 6 m, maybe 8 x 8 m; for international championships and Olympic games, the mat size should be 8 x 8 m. A ring of >1 m diameter with a 10 cm wide edge strip marks the mat's center. 1 cm thick mat with a soft covering. If possible, the surrounding protection strip should be 2 m wide; otherwise, boundary tapes at a 45° angle should be used. The protection band should be 1.2 m wide and mat thick, with a color difference. 1 m broad protection strip for national tournaments. Platform height is approximately 1.1 m, with no corner posts or ropes.

## WEIGHTLIFTING

4 x 4 m lifting space; ideally with sturdy timber basis, chalk markings, non-springing floor, firm footing for weightlifters.

>450 mm diameter of the largest weight

15 kg for single-handed exercises

For two-handed exercises, use a weight of 20 kg.

## BADMINTON

The standard is a doubles court, singles court only if space is lacking.

spacing between courts at side >0.30 m

between court and walls >1.50 m

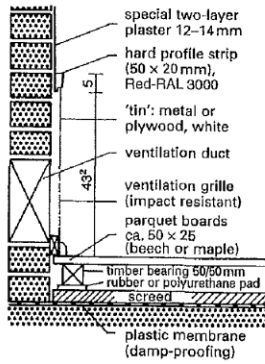
backwards spacing between courts >1.30 m

safety strip at each side 1.25 m

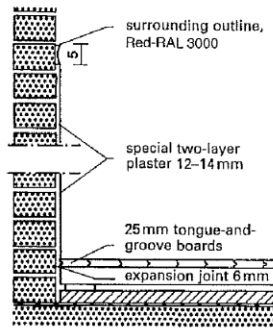
safety strip front and back, each 2.50 m

Spectators should be behind the safety strip.

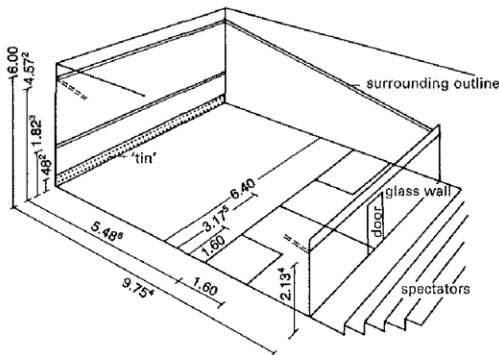
Hall height: 8 m international games, 6 m over rear partition. Net height at posts 1.55 m; in middle 1.525 m, net surface 76 cm high. Floor covering lightly resilient. Lighting: if possible no windows, but rooflight (glare-free) >300 lx.



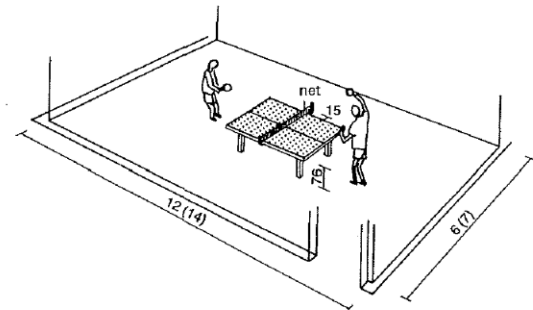
1 Squash court end wall



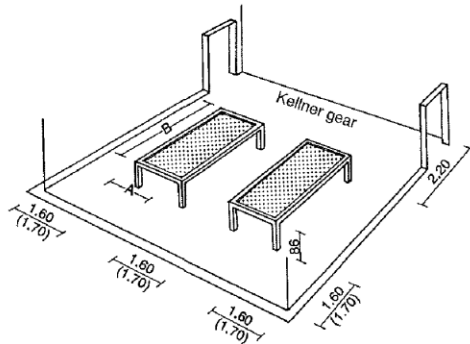
2 Squash court side wall



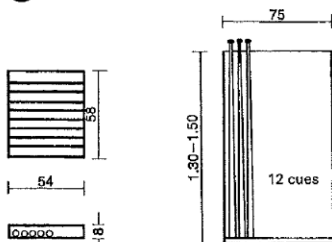
3 Basic dimensions for squash court



4 Basic dimensions for table tennis



5 Basic dimensions and spacings for billiards



6 Ball cupboard

7 Cue rack

8 Usual billiards table sizes

Normal table size (dimensions in cm)		I	II	III	IV	V	VI
internal (playing area)	A	285 × 142 <sup>5</sup>	230 × 115	220 × 110	220 × 100	200 × 100	190 × 95
external	B	310 × 167 <sup>5</sup>	255 × 140	245 × 135	225 × 125	225 × 125	215 × 120
room		575 × 432 <sup>5</sup>	520 × 405	510 × 400	500 × 395	490 × 390	480 × 385
weight (kg)		800	600	550	500	450	350

## SQUASH

The normal construction of squash courts involves massive walls with special plastered surfaces, pre-cast concrete elements, prefabricated paneled timber-framed roofs, collapsible seating.

Room size: 9.745 x 6.40 m

Room height: 6.00 m

A glass back wall is advantageous for spectators.

**Walls:** Special plaster, flat, white. Strip (the 'tin') running across foot of front wall: of sheet metal 2.5 mm or plywood with sheet metal cladding, painted white

## TABLE TENNIS

At championship level takes place only in halls. Table surface horizontal, matt green with white border lines.

Table area ..... 152.5 x 27.4 cm

Table height ..... 76 cm

Board thickness ..... >2.5 cm

For tables in the open air, fiber cement board 20 mm thick.

Board hardness: so a normal ball bounces 23 cm when dropped from 30 cm

Net length, centre ..... 183 cm

Net height, entire length ..... 15.25 cm

Playing box (formed by canvas screens 60-65 cm high) >6 x 12m, international 7 x 14m, spectators beyond screen

## BILLIARDS

Location of rooms:

First floor or well-lit basement, seldom ground floor.

**Space requirement:** for the various table sizes

Common sizes for private purposes ..... IV, V and VI

For cafes and clubs ..... IV and V

In billiards halls and academies ..... I, II and III

**Spacing of table sizes I and II from each other** ..... >1.70 m

**Spacing of table sizes III-V from each other** ..... >1.60 m

and, from the wall, a bit more if possible.

At the side where the waiter passes or the spectators stand, correspondingly more space, plus room for chairs, tables, food and drink (174, 175).

**Wall mounting** for cue rack and rules of the game.

1 cue rack for 12 cues, overall 150 x 75 cm.

## Lighting

The smallest possible lights with full and even light distribution onto the playing area. Usual height for light above table: 80 cm



## New Features In The Construction Of Physical Education Facilities

Facilities are transitioning from traditional glass to either a plastic or fiberglass panel or an above skydome. Sandwich panels made of lightweight fiberglass or manufactured sheets of translucent fiberglass bonded over an aluminum framework are becoming popular. They do not require painting, have cheaper labor and material costs, do not require shades or blinds to avoid glare, and the breaking problem is reduced or eliminated.

Some of the new features in gymnasium construction include the use of modern engineering techniques and materials, which has resulted in welded steel and laminated wood modular frames, arched and gabled roofs, domes that provide areas completely free of internal supports, exterior surfaces of aluminum, steel, fiberglass, and plastics, various window patterns and styles, several types of non-slip floor surfaces, prefabricated wall surfaces, and better lighting.

Built-in locks with combination changers are installed in locker rooms and service areas, allowing employees to change combinations as needed. Ceramic tiles are becoming increasingly popular due to their longevity and low-cost upkeep. The advantages of wall-hung toilet compartments allow for better maintenance and cleanliness since there is no danger of rust starting from the floor. New dispensers are handling odor control well. Nowadays, narrow profile heating, ventilating, and air conditioning fan coil units are employed.

The sports training and health suite are being updated to make it more appealing and functional. To ensure increased sanitation, there is also a tendency toward better ventilation, heating, and lighting, as well as more easily cleaned materials on walls and floors.



Picture 10

Floating Football Stadium

Other new trends in sports facilities, equipment, supplies, and materials include:

- New surface materials:
  - Rubberized all-weather running tracks
  - Rubber-cushioned tennis courts
  - Roll-out floor systems (portable football field the turf can be rolled up)
  - Personal storage units (lockers)
  - Air-supported structures
  
- Improved landscapes

- New ceiling
  - Partial shelters
  - Synthetic grass
  - Synthetic walls
  - Combination indoor-outdoor pools
  - Water slides
  - New physical fitness equipment
  - All-weather tennis courts/games area
  - New climbing walls
- Modern gymnasium construction features include
    - Using modern engineering techniques and materials which have resulted in
    - Welded steel
    - Domes that provide area completely free from internal supports
    - Laminated wood modular frames
    - Arched roofs
    - Gabled roofs
- Exterior surfaces
    - Aluminum
    - Steel
    - Fiber glass and plastics
- Floors
    - hydraulic floors surfaces
      - Myrial floors surfaces
      - Nonslip floors surfaces
    - New windows patterns and styles
    - Prefabricated wall surfaces
    - Better lighting systems with improved quality and quantity and reduced glare.
    - Facilities are moving from using regular glass to using either a plastic and fiber glass panel or an over head sky dome and they are

Advantages of Contemporary Facilities: When comparing modern facilities to traditional ones, the following benefits were noted:

- a) Light weight
- b) Require no painting
- c) Easy to maintain
- d) Less labour
- e) Material cost is lower
- f) Shades/curtains/blinds are not needed to eliminated glare.
- g) The breakage problem is reduced or eliminated.
- h) It helps to solve the problem of lack of money and land.

Technological innovation is a crucial driving factor in any business, particularly sport. Technology has aided in the construction of better facilities, resulting in better athletes, as well as in the safety of players on the field and the enhancement of the audience experience to boost decision-making and entertainment values.

# Maintenance of Sports Facilities and Equipment

## Facility Management

Planning for facility building or refurbishment is an essential management activity. Maintenance is an equally vital function of facility management. In this course, you will learn how to properly maintain sports facilities so that they last longer, create a healthier atmosphere, are less expensive to repair, and give a more enjoyable experience for users.

Facility management (FM) is a multidisciplinary profession that integrates people, place, process, and technology to assure the functioning, comfort, safety, and efficiency of the physical environment. Facility management entails proper scheduling, which includes facility maintenance, new structure planning, and growth to keep up with user demand.

The following facility management concepts will be implemented:

Facilities must be provide:

- 1) open to all, including those with impairments
- 2) brought up to code in terms of a plethora of environmental regulations
- 3) Conservation of energy
- 4) Long-term maintenance and repair costs
- 5) economical in terms of cost, time, and energy consumption
- 6) secure, safe, appealing, comfy, and clean
- 7) realistic and tailored to the individual's demands
- 8) low operating and maintenance costs
- 9) Facilities must take community safety into mind (e.g., sound, lighting)
- 10) available to user groups while remaining secluded enough that the activity does not distract individuals.
- 11) long-term in nature, with adaptability and expandability to suit the required charges.

Maintenance should be simplified if suitable planning, construction, and materials are used. Nothing is more humiliating than a new facility that turns out to be a maintenance nightmare due to bad management decisions made throughout the design and planning phases of the building process. Given an acceptable facility, it is up to the facility manager, in collaboration with other stakeholders, to take pleasure in the facility and make a particular effort to keep it in as near flawless shape as feasible.

Proper facility care will make it live longer, create a healthier atmosphere, be less expensive for repairs, and give a more gratifying user experience.

## Shared Facilities

A single facility can be designed to serve many functions. The facility might be designed for educational or instructional purposes. It can be used for university athlete training, competition, or recreational purposes by employees and other members of the community. In this case, the facility will be used by many groups of individuals for a variety of activities.

When there is little or no money available (due to the large capital investment for constructing), the following alternative techniques can be employed to ensure that the essential facilities are accessible to conduct excellent programs.

- i. Repairing and renovating existing structures
- ii. Repurposing existing buildings (e.g., cafeteria, amphitheater, through the use of movable walls rearrange the interiors, curtains, partitions)
- iii. Making existing facilities multifunctional (multipurpose activity stations)
- iv. Partnerships and joint enterprises

All of these scenarios included the sharing of a facility. However, when authority is obtained, management must set procedures to ensure that adequate measures (legal and fiscal) are taken and that such facilities are used effectively.

A policy should be created outlining who can use the facilities, when they can use them, and under what conditions.

If the policy is used by outsiders, it should include the following:

- i. Creating an appropriate application
- ii. Obtaining, if necessary, liability insurance coverage
- iii. Determining the price structure and method of payment
- iv. Making maintenance and security requirements.

It is very typical to see sporting facilities, such as a stadium or a school football field, being utilized for burials, marriage ceremonies, or political campaigning. Whether the facility will be shared by persons inside or outside the school system, suitable policies for proper use should be in place.

## **BUILDING FACILITIES FOR OLYMPIC SPORTS**

### **OLYMPIC GAMES, PLANNING AND VISION**

Many facilities built for the Olympics at great expense have been abandoned and left to rot but it's not all bad news with several host cities having worked hard to ensure a positive post-Games legacy.

The Greek capital of Athens was hit hard financially by hosting the 2004 Olympics, whereas Los Angeles is ready for another round after staging the 1984 Games.

Olympic efforts and the future of sport facilities

- Olympic games involve significant costs from lobbying efforts to construction the actual facilities
- Sydney: \$3.3 billion
- Athens: \$11 billion
- Beijing \$42 billion
- Russia: \$51 billion
- Brazil 2016: \$1 trillion

An incredible metal structure arches over the terrain twenty minutes east of downtown Sydney. It gives a spectacular welcome to the biggest Olympic Stadium ever built, towering approximately 14 floors above its usually flat surroundings. On September 15, 2000, 110,000 people will pack Stadium Australia to see what 4.5 billion others will watch on television: the opening ceremonies of the Olympic Games. The Games will conclude with a similar fanfare two weeks later, on October 1.

While practically everything about the recently completed stadium is impressive (including its \$448 million price tag), it is only one small element of a massive rehabilitation and construction project. Olympic organizers believe it has the ability to influence how the world thinks about the interconnected issues of growth, environmental preservation, and rejuvenation. This 1,900-acre tract of land, known as Homebush Bay, is being hailed as a blueprint for future development. While it is not the sole venue for Olympic activities, it is by far the most well-known, with the biggest concentration of sporting facilities in Sydney.

Homebush Bay, which is home to more than a dozen major sports venues, comfortable hotels, and a new solar-powered neighborhood for 6,000 inhabitants after the Games, elicits a "gee whiz" reaction from practically everyone who sees there.

It's hard to think that only 15 years ago, the region was little more than a massive landfill, home to a slaughterhouse, brickworks, and 9 million cubic meters of industrial and domestic trash collected over a 30-year period of unregulated dumping.

The notion of a fully new complex devoted nearly exclusively to sports and recreational amenities is unusual, and Sydney had the chance to create a strong example. Unlike Los Angeles, where no new facilities were developed before the 1984 Games, or Atlanta, where 10 new facilities were built prior to the 1996 Olympics, Sydney has begun from scratch in practically every aspect. Knowing the enormity of the job ahead, as well as the ecologically deteriorated land from which they began, Sydney made it a top goal to create an environmentally friendly facility. While past Olympic hosts have done a lot to maintain and conserve the environment — Barcelona cleaned up its waterfront, Lillehammer preserved trees and wetlands, and Nagano guarded butterfly meadows — none compare to Sydney. Sydney's commitment to ecologically sound, accessible facilities and practices has been ensured from the start of facility development until long after the Games are completed; all projects are guided by the idea of Ecologically Sustainable Development (ESD). Among the tenets of ESD are the conservation and protection of plant and animal species, the conservation of resources, and the management of pollution.

The facilities themselves were also closely monitored. "Contractors are expected to adhere to rigorous environmental plans, which cover problems like pollution reduction, conservation of existing trees, minimizing construction noise, and managing sedimentary runoff," says Michael Knight, head of the Sydney Organizing Committee.

While some changes were made throughout the buildings — for example, stressing significant water reclamation systems and utilizing only timber from sustainable forests — the architects of other facilities had more opportunity to make use of new technology and advances.

During the day, the Aquatic Centre, for example, utilizes enough natural illumination to require just 10 artificial light fixtures. Air conditioning is only available in spectator areas and eateries. During the day, the Sydney Showground is lit by natural light, while at night, movement-activated light fixtures are used to decrease light use. The Olympic Village will use solar power to meet all of its energy requirements; after the Games, it will be the world's largest solar-powered community.

Sydney will undoubtedly be at the forefront of environmental advancements, but the city also aims to be a pioneer in terms of accessibility. Because elements were incorporated throughout the whole complex at the design stage, Homebush Bay's unique location as a new, self-contained development makes it particularly suited to accessibility. To provide the most user-friendly design for the maximum number of individuals, an access committee composed of planners and persons with various impairments was constituted from the start. Many people have praised well-distributed lifts, ramps, assistive hearing equipment, tactile ground surface signs, accessible bathrooms, and TTY phone services.

The emphasis on environmental and accessibility concerns can often overshadow the reality that many of these facilities are visually pleasing. Consider the Olympic Stadium, the focal point of the Games. The massive structure is flanked by four main arches, two on each side of the amphitheater and inclined to delineate spectator seating spaces. Dozens of 10-by-10-meter transparent polycarbonate tiles span each of the two arches, shading spectators while enabling turf to grow on the inside of the amphitheater. The facility's flexible seating allows it to rearrange for special events, and restaurants are located so that guests don't miss a minute of the excitement.

Wary of Atlanta's last-minute scramble in 1996, the Sydney Organizing Committee has taken extra precautions to ensure that there is ample time to test out the new facilities and iron out any kinks before Olympians hit the stage. All but two of the facilities in Homebush Bay have been constructed. The Tennis Centre and Sydney Super-Dome are both projected to be finished by the end of the year. Four facilities in different places are still under construction, although the most recent reports suggest that all will be ready for competition by early 2000.

But all of this comes at a price. While many of the projects have been completed on time or ahead of schedule, the most recent figures reveal that construction is approximately 4% over budget. While inflation is mostly to a fault, 4% of a massive \$1.42 billion budget is a stunning \$47 million. Funding will come from a number of sources, including the Sydney Organizing Committee, but the government will cover the majority of the project - more than three-quarters of the total. Despite the astounding proportions, polls show that 90 percent of all Australians favor bringing the Games to Australia — albeit statistics for New South Wales, and especially Sydney, were unavailable.

### **What happened to the stadiums and sites from the previous Olympics?**

They are similar to electoral promises. They sound nice, and you want to believe them, but the chances of them coming true are just 50/50. Such are the lavish Olympic stadiums, arenas, and even highways that are created for a two-week worldwide gathering but are occasionally abandoned and allowed to deteriorate after the event.

The desire to "create a legacy" that extends beyond the Olympics in terms of infrastructures and national pride is a recurrent topic among bid cities. Too often, though, the billions of dollars invested dwindle in the weeks and months following the Olympics, when they are forgotten.

The International Olympic Committee is well aware of the issue, but emphasizes that it is not all negative news.



The International Olympic Committee (IOC) conducted a study on the post-Games use of all Olympic venues, and preliminary results as of 2019 show that 48 out of 54 Olympic stadiums are still in use, with four of them designed to be temporary and two of them being demolished after long years of service.

Indeed, some stadiums are still in use and perpetuate the Olympic legacy for which they were created, boosting the individual city's athletic culture decades after the Games were held.

To avoid draining the public purse by building brand new facilities for each Olympic Games, hosting countries have recently looked at sustainable solutions, such as using existing venues and temporary facilities, as well as building permanent venues only when there was guaranteed long-term post-Games use.

## **Troubled venues**

### **Rio Olympic Park**

Six months after the conclusion of South America's first Olympic Games, the aquatics stadium was drained of water, and the athletes' village was abandoned, resembling a ghost town.

A Brazilian judge ordered the Rio Olympic Park, which held basketball, swimming, and tennis tournaments as well as concerts and other events after the Olympics, to close in 2020 due to safety concerns. He said that the installation had been "progressively degraded by a lack of attention" and was "prepared for tragedy."



Picture 11

*The Deodoro Olympic Park canoe slalom circuit*

After the mayor's office in Rio filed an appeal, the park reopened 12 days later. The park is still in operation, with Brazilian swimming trials for Tokyo 2020 taking place in April at the Maria Lenk Aquatic Centre.

According to the IOC, the Olympic pool that appeared dry after the Games was always intended to be a temporary facility and was destroyed after the competition. It was later redeployed to other regions of Brazil, as originally planned.

### Athens 2004 Olympics venues

In 2008, Athens, the birthplace of the modern Olympics, was left with rotting and graffitied stadiums, as well as a debt problem. Many blamed the economic downturn on the 2004 Athens Olympics, which cost the government and taxpayers US\$11 billion for a 16-day event.



Picture 12 *Abandoned Olympic site of the 2004 Olympic Games, in Athens*

Meanwhile, Panathenaic Stadium, which was built entirely of marble and refurbished to host the first modern Olympics in 1896, remains a major tourist destination even after the Games. When the Games returned to Athens after 108 years, it was utilized to hold the archery competition as well as the Marathon finish line.

As Greece's finances improved, several of the venues that had been shuttered during the economic crisis began to host additional events or were repurposed.

## Pyeongchang Olympic Stadium



South Korean officials planned to construct a temporary stadium to guarantee that it would not become a white elephant after the 2018 Winter Olympics. In actuality, it would not exist at all since it would be disassembled soon after the Games, with no post-event maintenance expenditures. Furthermore, to save money and time, the arena lacked a roof and heating, and attendees were given hot packs and blankets to keep warm.

All well and good in principle, but the transitory stadium nevertheless cost US\$109 million to construct. It was only utilized four times before being dismantled at a cost of almost US\$10 million per hour of real usage.

### Conclusion:

Hosting the Olympics costs more money than most people can fathom, and it's not getting any cheaper. It's easier and more cost effective for cities that already have some of the necessary venue requirements than it is for those who have to start from scratch. For this reason, many cities have started to withdraw their bids to host the games. [Boston and Hamburg](#) have already dropped out of the running for 2024.

Olympic games involve significant costs from lobbying efforts to construction the actual facilities

Sydney: \$3.3 billion

Athens: \$11 billion

Beijing \$42 billion

Russia: \$51 billion

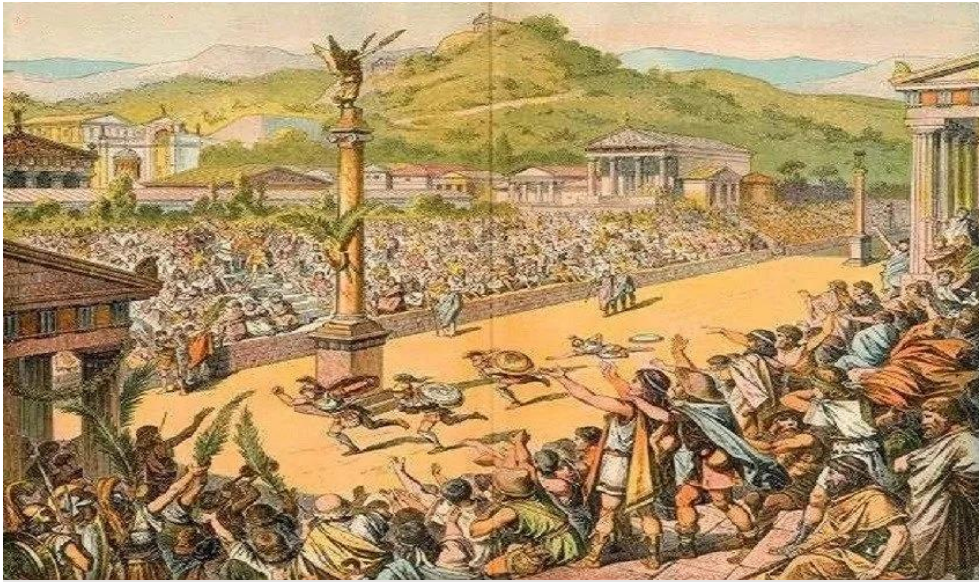
Brazil 2016: \$1 trillion



## HISTORICAL DEVELOPMENT IN EUROPE

### Greece:

Greece held the modern Olympic Games twice, the first 1896 Summer Olympics and the 2004 Summer Olympics; the country also hosted the 1906 Intercalated Games, which were considered as Olympic Games at the time but are no longer officially recognized by the International Olympic Committee. The country has competed in every Summer Olympic Games, making it one of just four countries to do so, as well as the majority of Winter Olympic Games. Greece is traditionally called first in the parade of nations since it is the founder nation of the ancient forerunner to the modern Olympics, and its national governing body is the Hellenic Olympic Committee.



*Picture 13*

*First Olympic, 776 BCE, Athens, Greece*

Beginning in 776 BC, the first known stadiums were erected to host the Olympic Games. Tens of thousands of Greek residents gathered at Olympia, Greece, to see the inaugural Olympic event — a 200-yard footrace — take place. The stadium, the first Olympic event, was run simply on packed clay, subsequently augmented with basic demarcations between lanes at the starting line and a row of flat stones across them, ensuring that all runners had an even, level surface from which to begin the race.



Picture 14

Panathenaic Stadium Athens

The Panathenaic Stadium in Athens, erected in 330 BC, has a capacity of 50,000 people and stands as a testament to endurance. The Panathenaic Stadium, the world's only marble stadium, has been in operation for two millennia, including events in the 2004 Olympics.

### **The Heraean Games**

The Heraean Games, dedicated to the goddess Hera, queen of the Olympian gods and wife of Zeus, was the first official athletic competition for women, held in the Olympic Stadium of Elis. The games, which took place in the 6th century BC, were probably held in the Olympic year itself, before the men's games.

Originally, the Heraean Games consisted only of foot races. The winners of the competitions were rewarded with olive crowns and the meat of an animal sacrificed to Hera. They were also given the right to dedicate statues or portraits to Hera - the winners inscribed their names on the columns of Hera's temple. The only recorded winner of the foot races is the mythical Chloris, the niece of Pelops, who is also said to have been the granddaughter of Zeus.

Participation in the Heraean Games was limited to young, unmarried women. Men usually competed naked in the Olympic Games, but women who participated in the Heraean Games usually wore a chiton, a garment worn by men during hard physical labor. Pausanias describes their appearance thus, "Their hair hangs down, the tunic reaches just above the knee, and they bare their right shoulder to the breast."

No one is certain about the origin of the Heraean Games. Pausanias puts forward two different theories on the subject. The first theory is that Queen Hippodameia was grateful to Hera for her marriage to Pelops and chose 16 women to compete in Hera's honor. The other theory is that this was the result of diplomatic efforts to resolve tensions between the cities of Elis and Pisa (in western Greece). Sixteen wise, elderly women were chosen from each of the 16 city-states of the Peloponnese to weave a robe for Hera every four years and organize the games as a symbol of peace. Pausanias wrote: "Every fourth year a robe is woven for Hera by the sixteen women, and the same hold games called Heraea."

We cannot determine what social changes led the Greeks to introduce separate games for women or whether the Heraean games were merely a temporary relaxation of restrictions on women. Most historians, however, suggest that it may have been due to increasing Roman influence on the Hellenic peninsula. In Rome, the daughters of wealthy families participated freely in the men's festivals and athletic competitions.



Picture 15

Olympic stadium

### **Spartan women**

Unlike the rest of Greece, where women had to wear long and heavy dresses that hid their bodies, lived secluded lives, and were prevented from learning hunting, horseback riding, and other physical activities, women in Sparta wore short dresses, went wherever they wanted and were encouraged to participate in the same physical activities as their male counterparts. However, this was only out of the belief that a physically fit woman would bear strong children.

However, Spartan women enjoyed a kind of social status that was unattainable for women in the rest of classical Greece. Although excluded from formal military and political life, they were responsible for managing their lands and could even own them. Sarah B. Pomeroy notes in *Goddess, Whores, Wives, and Slaves: Women in Classical Antiquity* that Spartan women owned about 35-40% of all Spartan land and property in the 4th century BC.

Young Spartan girls received the same education as their male counterparts, rarely married before the age of 20, and may have even participated in the *Gymnopaedia* or 'Feast of the Naked Youths'. Perhaps not surprisingly, the majority of participants in the Heraean Games were Spartan women.

### **Ancient Olympic Events**

The ancient Olympic Games were initially a one-day event until 684 BC when they were extended to three days. In the 5th century BC, the games were again extended to five days. The ancient games included running, long jump, shot put, javelin, boxing, pankration, and horseback riding.

### **Pentathlon**

The pentathlon became an Olympic sport in 708 BC with the addition of wrestling and included the following disciplines: **Running / Jumping / Discus Throw**



## **Running**

The running competitions included:

the Stade Run, which was the main test of speed, covering the Olympic track from one end to the other (200 m foot race),

the Diaulos (two stades - 400m foot race),

the Dolichos (between 7 and 24 stades).

## **Jumping**

The athletes used stone or lead weights, called Halteres, to increase the distance of a jump. They held the weights until the end of their flight and then threw them backward.

## **Discus Throw**

The discus was originally made of stone and later of iron, lead or bronze. The technique was very similar to today's freestyle discus throw.

## **Wrestling**

It was highly valued as a form of military exercise without weapons. It ended only when one of the combatants admitted defeat.

## **Boxing**

Boxers wrapped straps (humans) around their hands to strengthen their wrists and stabilize their fingers. Originally these straps were soft, but over time boxers used hard leather straps that often disfigured their opponent's face.

## **Pankration**

This was a primitive form of martial arts that combined wrestling and boxing and was considered one of the toughest sports. The Greeks believed that it was founded by Theseus when he defeated the ferocious Minotaur in the Labyrinth.

## **Equestrian events**

These included horse races and chariot races, which were held in the Hippodrome, a wide, flat, open space.

## Rome:

The Romans took the stadium concept to the next level by building circular amphitheaters. With its spherical, enclosed shape that enhances the spectator experience from every angle, these multifunctional buildings foreshadowed modern stadiums. Gladiator fighting, theatrical productions, even executions, and exotic animal hunts were held at the Roman stadium. The weather-beaten but still existing Colosseum of Rome could hold at least 60,000 spectators, which is similar to Ford Field of the Detroit Lions and Soldier Field in Chicago.



Picture 16

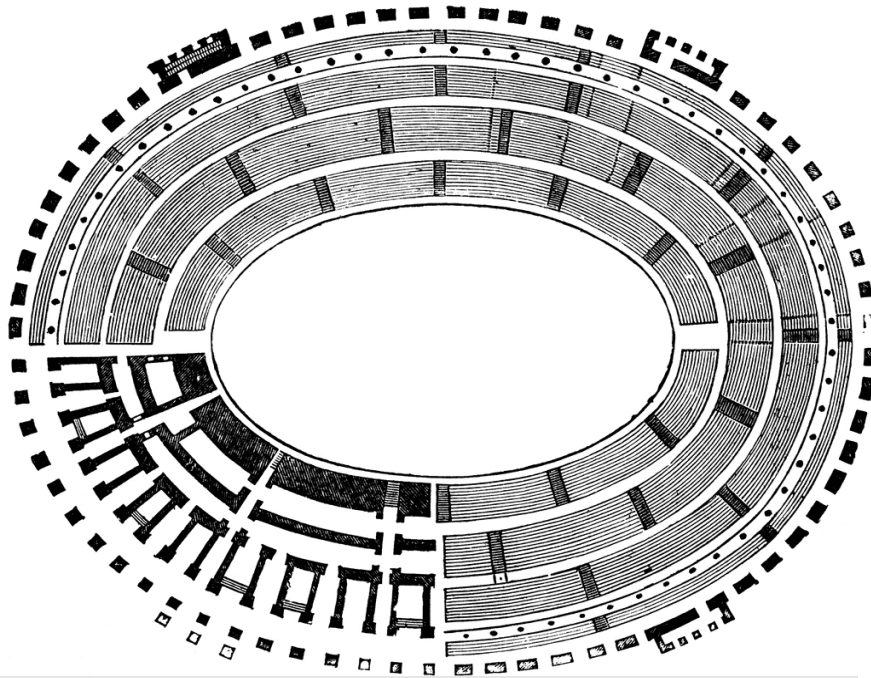
Roman Amphitheatre

The Romans also built the Circus Maximus, which could accommodate 150,000 people. Circus Maximus had a chariot and horse races. As shown in the classic film Ben Hur, they were both fascinating and lethal.



Picture 17

Circus Maximus



Picture 18 Ground Plan of the Colosseum

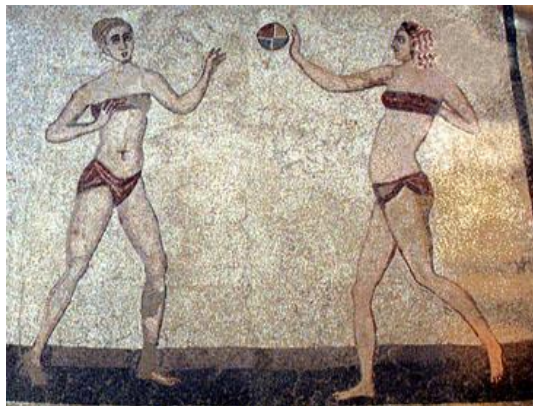
The Circus was Rome's most important place for ludi, or public games associated with Roman religious festivals. Ludi was sponsored by notable Romans or the Roman state to benefit the Roman people (Populus Romanus) and gods. The majority were conducted once a year or at regular intervals on the Roman calendar. Others, such as games in celebration of a victory, may be offered to fulfill a religious commitment. Tarquin the Proud swore to Jupiter in the late Regal era for his victory against Pometia the first triumphant Ludi at the Circus, according to Roman legend.

### **Ancient Roman Ball Games**

A variety of balls have been identified which ranged from bouncing balls to wool balls. Ball games include handballs, Trigon, Soccer, Field Hockey, Harpastum, Phaininda, Episkyros, follies, paganica and also catch games.

**Trigon** was a ball game played by the ancient Romans. The name derives from the Greek τρίγωνος (trigōnos, "three-cornered, triangular"), and may have been a romanized version of a Greek game called τρίγων (trigōn). It was a type of juggling game, that probably involved three players standing in a triangle (hence the name) and passing a hardball back and forth, catching with the right and throwing with the left hand. Besides the three players, called trigonali, there were also assistants called pilecripi, who kept score and retrieved runaway balls.

A minimum of three people are required to play trigon. Three people would stand in a triangle formation and would strike the ball towards the person to the right of them with their right hand. The players catch incoming balls with their left hand. Trigon was usually played with more than one ball. More than three people could participate in trigon. There were other roles in the game, like scorekeeper and someone who would retrieve stray balls.



### **Description in the Satyricon**

Petronius's *Satyricon* has a description of a ball game usually assumed to be trigon, although its name is never mentioned. The bald old man Trimalchio is playing with a couple of young curly-haired slave boys. Trimalchio is obviously not a serious trigon player because he plays in his sandals, and he never stoops to retrieve the ball but instead has a servant replace it with a fresh ball from a big sack. When he snapped his fingers, a slave brought him water to wash his hands, and when he was finished he dried his hands with the long curly hair of the young slave boys.

Petronius also remarks that in this case, the pilecripus did not count the number of times the players successfully passed the ball, but instead the number of balls that dropped on the ground. This may be a joke making fun of Trimalchio's low level of skill, or simply an innovative scoring method.



### **Harpastum**

Harpastum was a simple small ball game played by five to twelve players in the ancient country of Rome. It was played on a rectangular field marked by boundary lines and split by a center line.



## Ancient Roman Gladiators

Perhaps no figure from ancient Rome is as famous as the gladiator — a warrior of the arena that fought to the death against beasts, criminals, and other gladiators, for the entertainment of Roman society.

Gladiators have become heavily mythologized figures, in part thanks to famous works of fiction like the film *Gladiator*, directed by Ridley Scott and starring Russell Crowe

### Gladiator games

Most often gladiators fought each other and competed against different types of fighters who were considered complementary. Mirmillos often fought Thracians, but also Hoplomachus and Retiarius. A retiarius (net and trident fighters) usually fought gladiators armed with more conventional weapons.

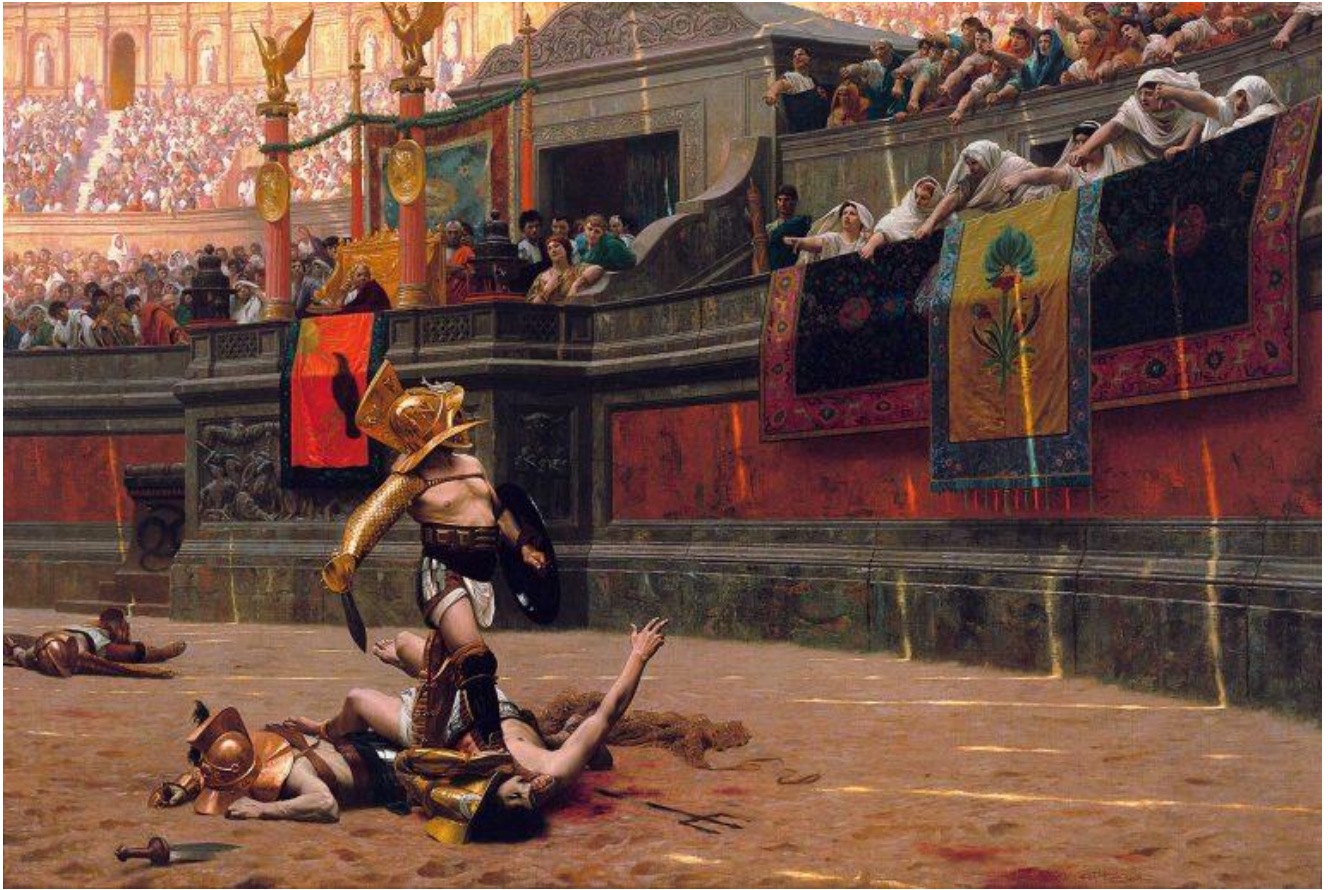
The fights were well organized and supervised by referees. Not all of them ended in death. Often a fight ended without either fighter dying - the reason was simple: training and maintaining a stable of gladiators was expensive, so their owners wanted them to survive as long as possible. In the early years of the Colosseum, more fights were fought to the death, but as time went on, the fights became less deadly because replacing dead gladiators was costly.

There were other types of violent entertainment popular in ancient Rome that were often associated with gladiators, but in reality, had nothing to do with them.

### What animals did the Roman gladiators fight?

That gladiators fought animals is a common misconception. Gladiatorial fights were strictly regulated and organized, and gladiators fought only against other human fighters. Wild animals did appear in the arena, but usually as part of the *damnatio ad bestias*, literally meaning "condemnation to the beasts," in which criminals and prisoners of war were publicly executed by the claws and fangs of wild animals, or as part of mock hunts by professional hunters. There was a type of fighter who fought wild animals, the *bestiarus*, but he was not considered a gladiator in the same sense as the others.





### **Staged naval battles, the naumachia**

Naumachia, staged naval battles with real ships and combatants, were probably the most spectacular of all Roman blood sports. Unlike gladiatorial combat, which took place somewhat regularly in the arenas of many large cities, the naumachia was reserved for special occasions, such as the commemoration of the triumph of Julius Caesar in 46 B.C. Participants were often prisoners of war or criminals sentenced to death. The fights were much bloodier than gladiator fights and the mortality rate much higher.

Naumachia was usually held in purpose-built arenas, large canals, or artificial lakes, but in some cases, they were held in traditional Roman amphitheaters. It is known that in the Roman Colosseum two naumachia were held near the inauguration date.

### **Czech Republic:**

is a stadium in Prague's Strahov area. It was designed for large synchronized gymnastics shows, with a field three times the length and three times the width of a conventional Association football pitch. It has a seating capacity of 56,000 and a capacity of 250,000 people, making it the largest contemporary stadium and the second-largest sports facility ever built.

As of 2019, the stadium is no longer utilized for competitive sporting events; instead, it serves as a training facility for Sparta Prague and hosts pop and rock concerts. The stadium is located atop Petn Hill, with a view of the ancient city. It may be reached by riding the Petn funicular up the hill via the gardens, or by taking tram lines 22, 23, or 25 to Malovanka station.



Picture 19

*Great Strahov Stadium from southeast*

The original stadium was built between the World Wars during the First Republic and served as a location for popular Sokol demonstrations of huge synchronized gymnastics. The first stadium, on the existing ground design for the VIII.-Vesokolsk slet, was built in 1926. In 1932, the stadium was refurbished for the IX.-Vesokolsk slet. On his horse Hektor, Czechoslovak President T. G. Masaryk, who had been a member of Sokol



Picture 20

*Všesokolský slet in 1932*

since he was thirteen, attended both of these performances. The greatest crowd was reported in 1938, on the occasion of the "World anti-war" jubilee X.-Vesokolsk slet.

Many people were drawn to performances including thousands of gymnasts performing in various intricate formations, with some performers acting in synchrony as traditional folk music played overhead. Some of the



most popular concerts included young well-trained recruits wearing only boxer shorts while on exhibit, as well as ladies dancing in miniskirts. Unlike the troops, who were required to practice and participate, the volunteer gymnasts were assembled from top-level local athletic organization members who routinely trained for the display during the year previous to the event. Until 1985, the tournament was held semi-decadally.



Picture 21

1980 Spartakiad on Great Strahov Stadium

There were discussions of dismantling the arena at the beginning of the twenty-first century. Those discussions, however, have since dwindled. AC Sparta Prague renovated a portion of the stadium in 2003 with financial assistance from the City of Prague. Eight football fields were constructed, and it is presently utilized as a Sparta training facility. The stadium's complex management was resolved in 2014, and it is currently owned by the city of Prague.

The stadium was used to shoot the 2019 Apple iPhone XR "Color Flood" advertisement, which featured a big number of people sprinting in various colored jumpsuits.



Picture 22

The Great Strahov Stadium

## History of Sports in Timeline

### **Creation of Baseball (June 8, 1839)**



You may have heard that baseball was conceived in the summer of 1839 in Cooperstown, New York, by a young man named Abner Doubleday. After that, Doubleday became a Civil War hero, and baseball became America's favorite game.

### **First College Football Game (Nov 6, 1869)**

On November 6, 1869, Rutgers and Princeton played what was billed as the first college football game.



### **Lawn Tennis Invented (Jul 12, 1873)**

An Englishman, Major Walter C. Wingfield, invented lawn tennis in 1873 and first played it at a garden party in Wales. It later became known as just regular tennis.



### **Basketball Creation (Dec 13, 1891)**



Basketball is the only major American sport with a clearly identifiable inventor. James Naismith wrote the sport's original 13 rules as part of a December 1891 class assignment at a Young Men's Christian Association (YMCA) training school in Springfield, Massachusetts. Born and educated in Canada, Naismith came south to pursue his interests of physical education and Christian ministry. Naismith expanded on an assignment to create a game that could be played in YMCA gyms during the winter.

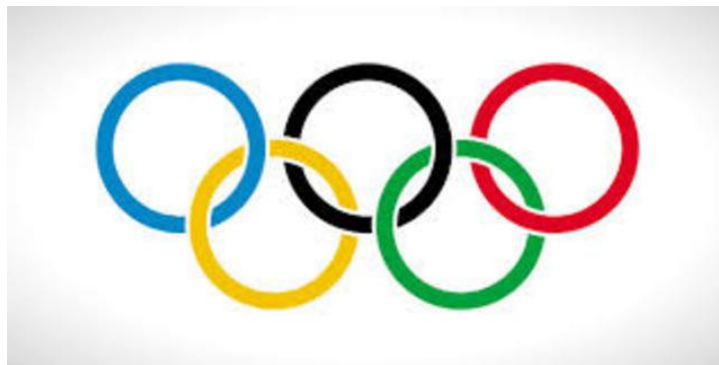


### **First Volleyball Game (Feb 9, 1895)**



The game of volleyball, originally called “mintonette,” was invented in 1895 by William G. Morgan after the invention of basketball only four years before. Morgan, a graduate of the Springfield College of the YMCA, designed the game to be a combination of basketball, baseball, tennis, and handball.

### **Olympic Games (Apr 6, 1896)**



The modern Olympic Games are the leading international sporting event featuring summer and winter sports competitions in which thousands of athletes from around the world participate in a variety of competitions.

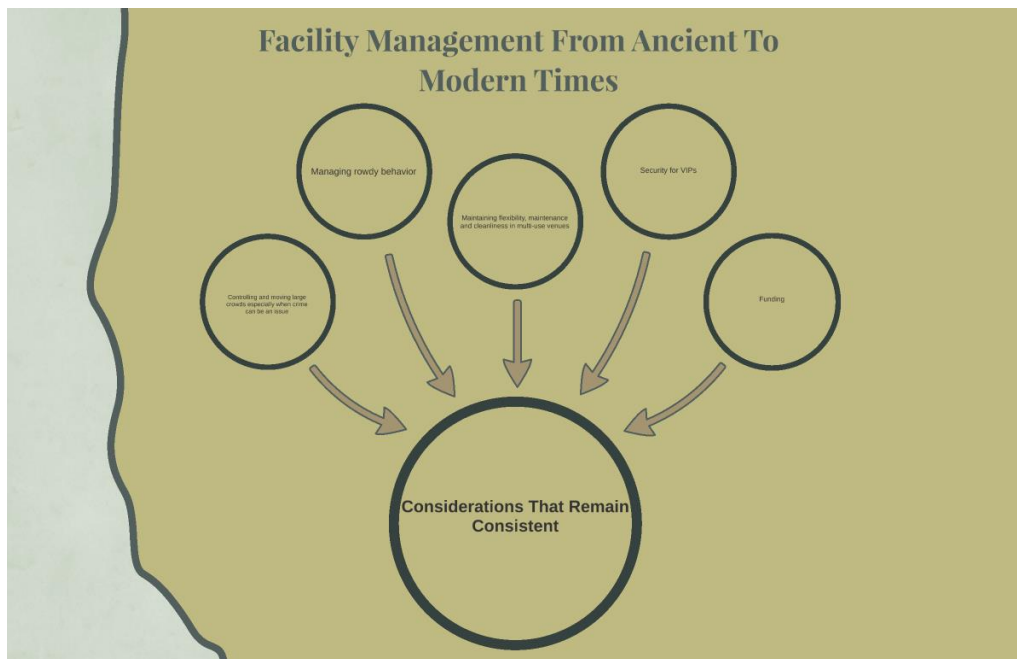
### **First U.S. Open in Golf (Oct 4, 1895)**



The event took place at Newport Country Club in Rhode Island. It was a nine hole course, and the tournament took one day. 10 professionals entered the tournament.



## Sports Facilities Management from Ancient to Modern Time



### **Similarities of facility management from ancient to modern times**

- Controlling and moving large numbers of people
- Managing rowdy or violent crowds
- Maintaining flexibility in multiuse venues
- Providing security and protection for VIPs
- Controlling the types of petty crime inherent with large gatherings of people
- Keeping facilities clean and operational

### **Difference of facility management from ancient to modern times**

Providing amenities for the press

1) Interview rooms

2) Press boxes with internet access

- Setting up TV camera platforms and TV cable hookups
- Selling advertising space and naming right
- Using hearing ventilation, and air conditions (HVAC) system
- Modern parking concerns for thousands of cars and buses
- The amount of food and beverages needed to feed over 100,00 fans at some venue
- Complying with environmental, zoning, accessibility, and other legal issues

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